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OMB No. 2040-0042 Approval Expires 4/30/07

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number			
		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

Owner Name: Team Completion, L.L.C.

Street Address: PO Box 1104 | Phone Number: (231) 258-9130

City: Kalkaska | State: MI | ZIP CODE: 49646

III. Operator Name and Address

Owner Name: Team Completion, L.L.C.

Street Address: PO Box 1104 | Phone Number: (231) 258-9130

City: Kalkaska | State: MI | ZIP CODE: 49646

IV. Commercial Facility

[x] Yes
[ ] No

V. Ownership

[x] Private
[ ] Federal
[ ] Other

VI. Legal Contact

[x] Owner
[ ] Operator

VII. SIC Codes

SIC Codes
Oil and Gas - 1311 (NAICS - 211111)
Sanitary Landfill - 4953 (NAICS - 562212)

VIII. Well Status *(Mark "x")*

[x] A. Operating — Date Started mo day year: 07/23/2004

[x] B. Modification/Conversion

[ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

[x] A. Individual

[ ] B. Area

Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
1	1	Weber 4-8 Salt Water Disposal Well

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	D	Presently permitted as Class II, Type D Proposed as Class II Type D and Class I non-hazardous.	1

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						8	25N	11W	SE	1115	N	1209	E

XII. Indian Lands *(Mark "x")*

[ ] Yes
[x] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
Don Tinker, Member	(231) 357-1016
C. Signature: Don Tinker	D. Date Signed: 06/25/2008

EPA Form 7520-6 (Rev. 8-01)

ATTACHMENT A
AREA OF REVIEW

An Area Of Review (AOR) of a radius of 1/4 mile from the well bore was used for this permit application. A volumetric fillup calculation of the area of the emplaced fluid showed that the injected fluid would be less than 1/4 mile (1320') from the well bore after 30 years of injection at an average rate of 87.5 GPM or 3000 BPD.

The volumetric fillup calculation was made utilizing the following formula:

this is not the equation that is used in the regs.

$$r = \sqrt{\frac{(Q) \times (.1337)}{(\pi h \Phi) \times (1 - S_w)}}$$ ~ cu ft

where:
- r = radius of volumetric fillup (feet)
- Q = volume of waste injected (gallons)
- π = 3.1416
- h = thickness of injection zone (feet)
- Φ = porosity expressed as decimal
- Sw = immoveable water saturation

Solution after 10 years of injection at average rate of 3000 BPD or 87.5 GPM:

- Q = 459,900,000 gals.
- h = 450 feet
- Φ = 12.0 %
- Sw = 30 %

$$r = \sqrt{\frac{(459{,}900{,}000)\times(.1337)}{(3.1416\times 450\times 0.12)\times(1-.30)}} = 720'$$

Solution after 20 years of injection at average rate of 3000 BPD or 87.5 GPM:

Q = 919,800,000 gals.

h = 450 feet

Φ = 12.0 %

Sw = 30 %

$$r = \sqrt{\frac{(918{,}800{,}000)\times(.1337)}{(3.1416\times 450\times 0.12)\times(1-.30)}} = 1018'$$

Solution after 30 years of injection at average rate of 3000 BPD or 87.5 GPM:

Q = 1,379,700,000 gals.

h = 450 feet

Φ = 12.0 %

Sw = 30 %

$$r = \sqrt{\frac{(1{,}379{,}700{,}000)\times(.1337)}{(3.1416\times 100\times 0.12)\times(1-.30)}} = 1246'$$

ATTACHMENT B
MAPS OF AREA AND AREA OF REVIEW

The following maps are included in this Attachment:

- A state map indicating plant location.

- Local map showing surface and subsurface location off all wells found within the 1/4 mile Area of Review (AOR) that penetrate the proposed injection zone.

- Local map showing 1/4 mile AOR and all wells found that penetrate the proposed injection zone within Section 8, the West Quarter of Section 9, the South Quarter of Section 5 of Township 25 North, Range 11 West of Grand Traverse County Michigan.

- A Topographic map showing residences, roads, surface facilities, bodies of water, well locations and 1/4 mile Area of Review. Property Owners Within the Area of Review (AOR) are shown on Table B-1.

Figure B-1

Michigan State Map

Figure B-2

Local map showing surface and subsurface location off all wells found within the 1/4 mile AOR) that penetrate the proposed injection zone.

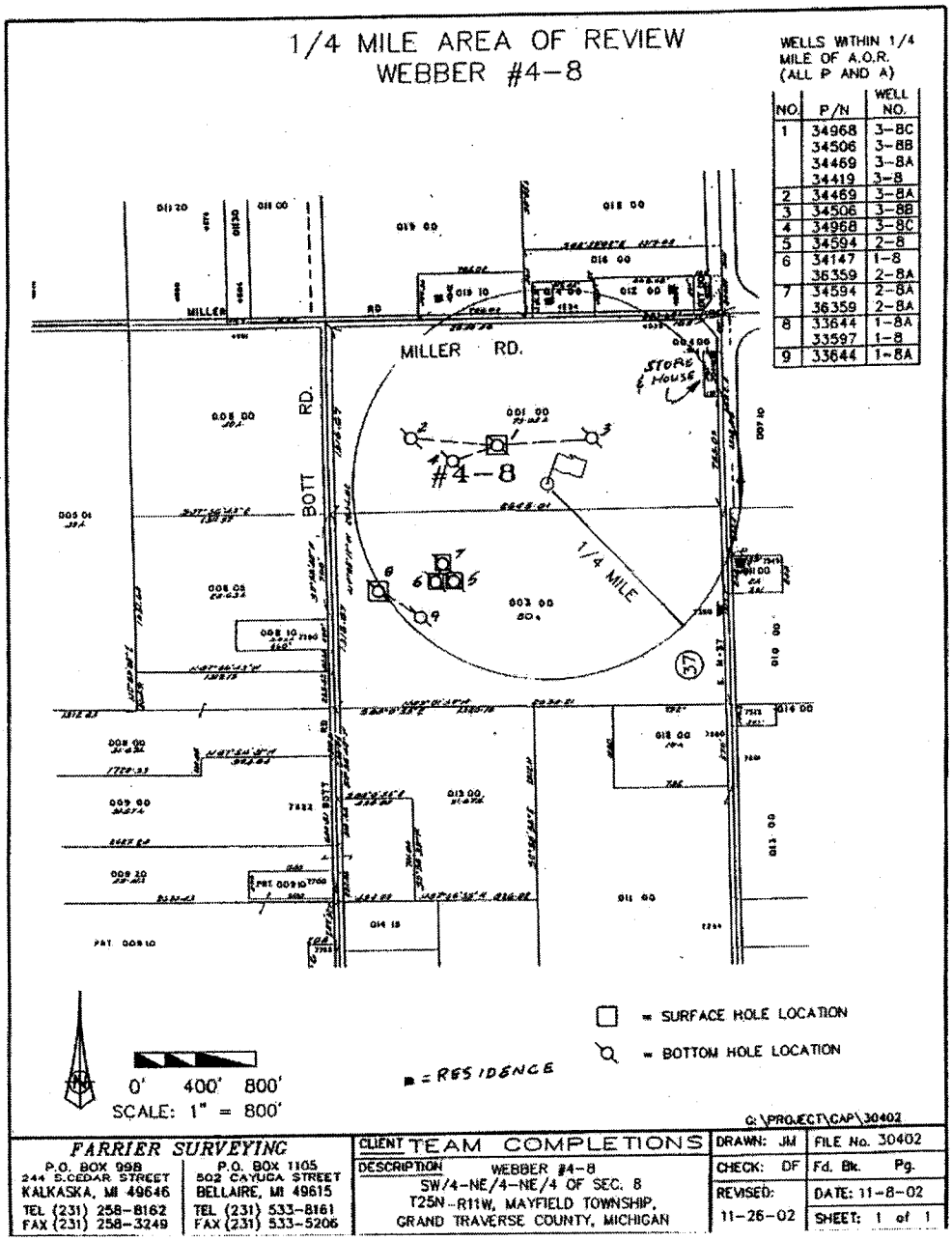
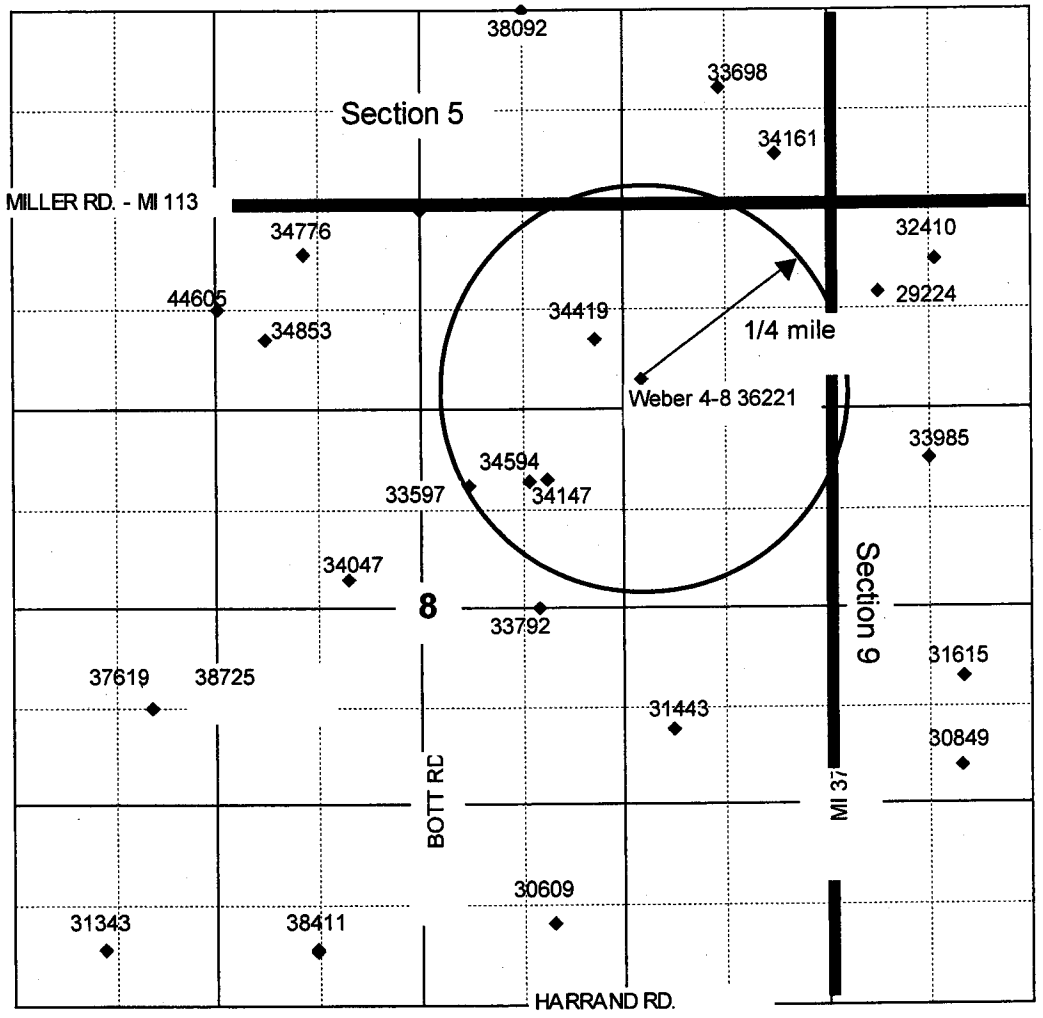


Figure B-3

Local map showing all wells found that penetrate the proposed injection zone within the West quarter of Section 9, South quarter of Section 5 and all of Section 8 of T25N, R11W, Grand Traverse County MI

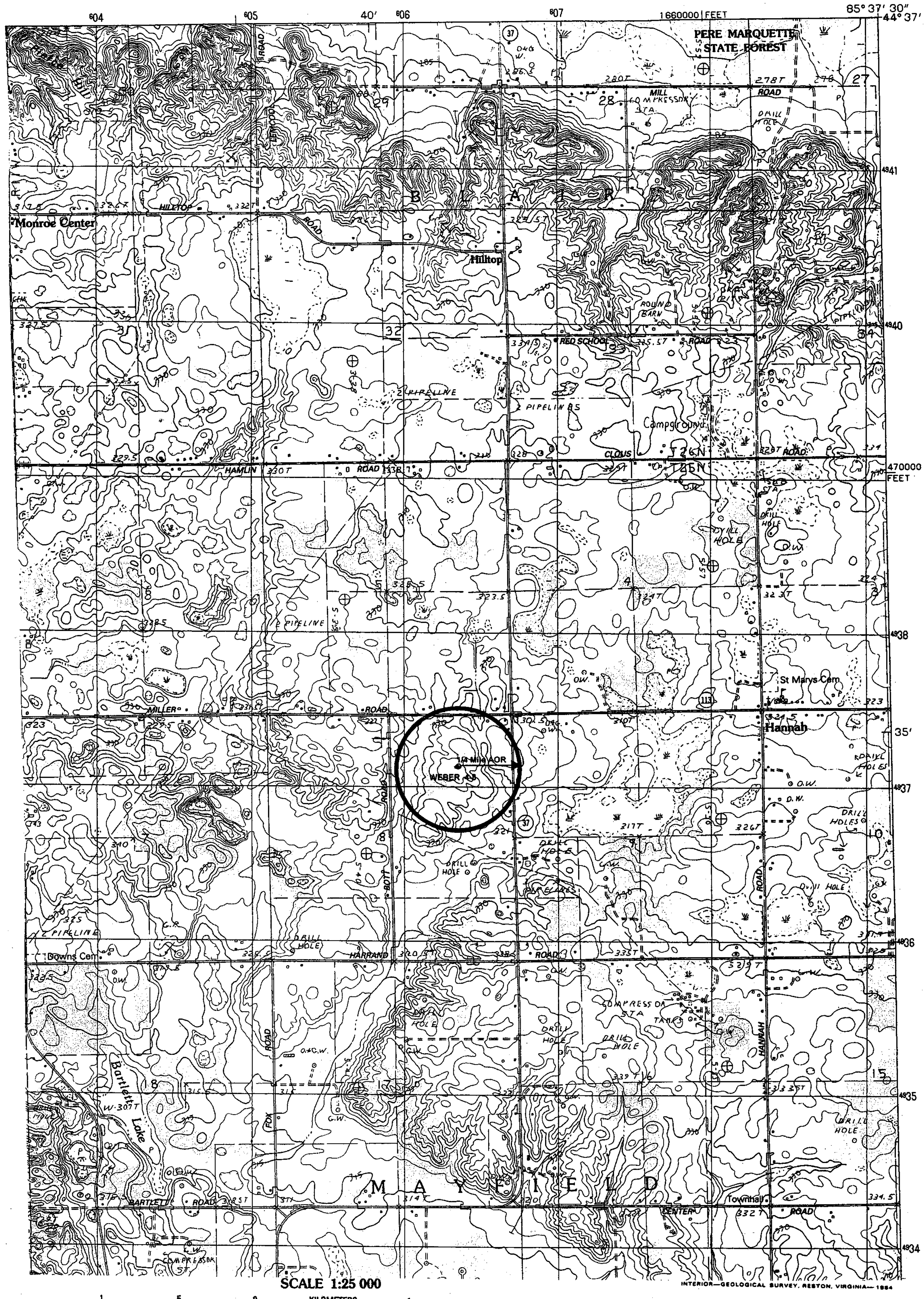


Surface location of vertical drilled wells shown on map. See Figure B-2 for bottom location of Directional drilled wells within 1/4 mile AOR.

MI Permit # 36221 Weber 4-8
MI Permit # 33597 Bott Berry 1-8
MI Permit # 34147 Berry et al 1-8
MI Permit # 34419 Weber 3-8
MI Permit # 34594 Berry 2-8

Figure B-4

BUCKLEY QUADRANGLE
MICHIGAN
7.5 MINUTE SERIES (TOPOGRAPHIC)



CONTROL ELEVATIONS SHOWN TO THE NEAREST 0.1 METER
OTHER ELEVATIONS SHOWN TO THE NEAREST 0.5 METER

To convert meters to feet multiply by 3.2808
To convert feet to meters multiply by .3048

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
AND THE GEOLOGICAL SURVEY DIVISION
MICHIGAN DEPARTMENT OF NATURAL RESOURCES, LANSING, MICHIGAN 48909

ROAD LEGEND

Improved Road
Unimproved Road
Trail

Interstate Route U. S. Route State Route

BUCKLEY, MICHIGAN

PROVISIONAL EDITION 1983

44085-E6-TM-025

Page B-5
Jan. 2008

TABLE B-1

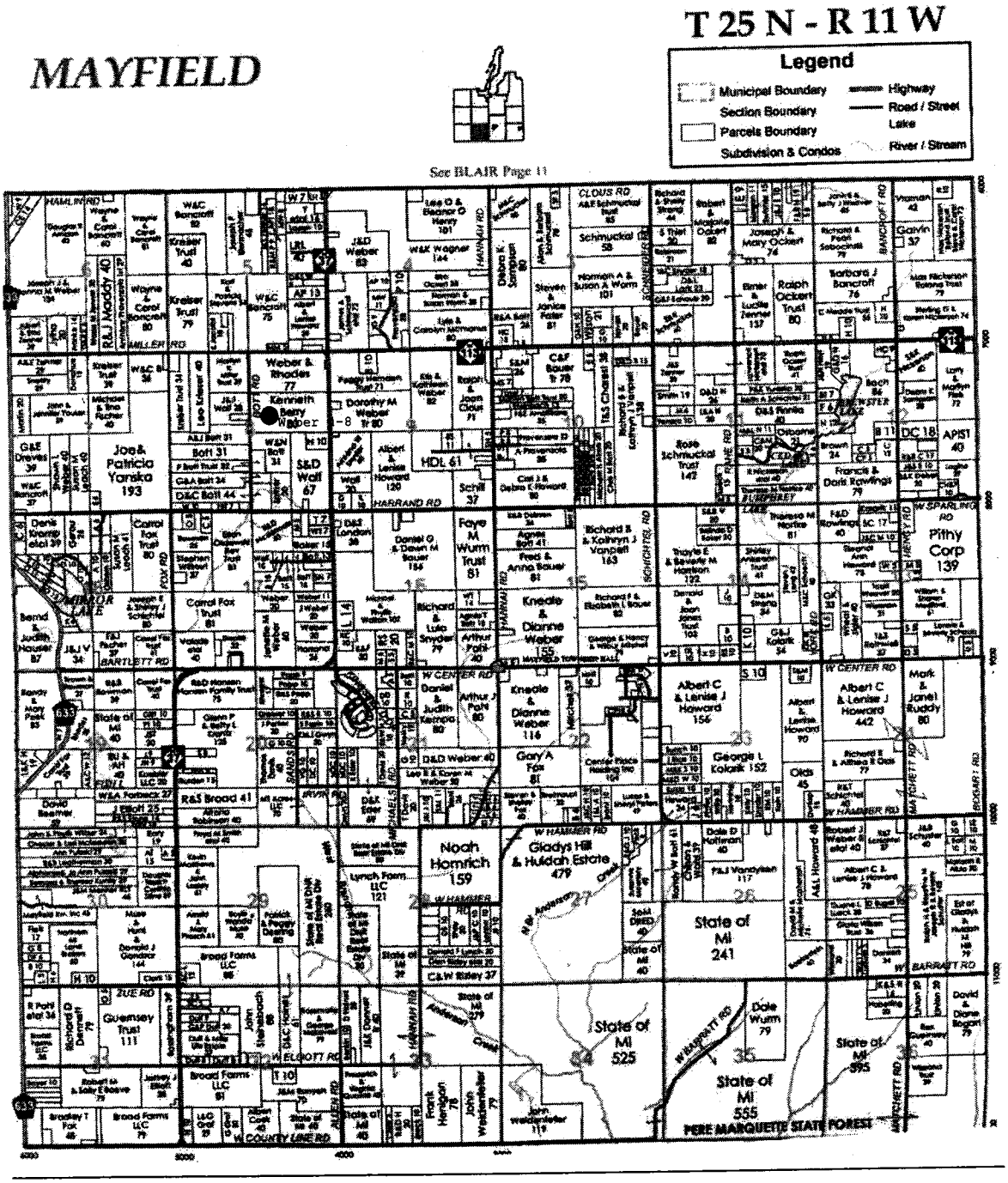
Property Owners Within Sec. 4, 5, 8 and 9 of T25N, R11W
Mayfield Township, Grand Traverse County, Michigan.

TAX ID # (28-09)	Owner	Address
004-010-00	Jim Schmuckal	S.M 37
004-010-10	Laurel & York Ash	Jasper Tr.
004-010-11	Heather Pfau & Nick Kreiser	6701 Jasper Tr.
004-010-20	Brian Steinebach	M 113
004-010-40	Elizabeth Hewlette	3730 W M 113
004-010-50	Sheryl Mcmorris	3712 W M 113
004-010-55	Brad & Cory Swy	3694 W M 113
004-010-60	Joe Galligan	Jasper Tr.
004-010-65	Laurel & York Ash	Jasper Tr.
004-010-70	Laurel & York Ash	6655 Jasper Tr
004-013-00	Jesse Bishop	6901 S M 37
005-009-00	Karl Stevens	4516 Miller Rd
005-011-00	Kathy Jacobs	4680 Miller Rd
005-011-20	Kathy Jacobs	4680 Miller Rd
005-011-21	Suzanne Jacobs	4622 Miller Rd
005-011-30	Mason Stevens	4606 Miller Rd
005-012-00	Mary Jo Lhamon	4068 Miller Rd
005-014-00	Allen Deater	4224 Miller Rd
005-014-01	Jason Deater	4170 Miller Rd
005-015-00	Al Howard	SM ?
005-016-00	Peggy Herndon	
005-019-00	Wayne Bancroft	5150 Miller Rd
005-019-10	Michael Moore	4342 Miller Rd
008-001-00	Weber	
008-001-01	Weber	4029 Miller Rd
008-003-00	Berry	7390 S M37
008-004-00	Herdon	7082 Miller Rd
008-005-00	Miller	4691 Miller Rd
008-008-05	Joe Wolf	7288 Bott Rd
008-008-10	Justin Wolf	7390 Bott Rd
008-008-00	Owen Bott	
008-009-00	Ron Bott	7622 Bott Rd
008-009-10	Greg Bott	7700 Bott Rd
008-009-20	Frank Bott	7134 Hannah Rd
008-011-00	Stan Wolf	7764 S M37
008-012-00	Rodney Nesky	7580 S M37
008-012-01	???	
008-013-00	William Bott	Bott Rd
009-007-10	Peggy Herndon	W M 113
009-007-11	Patricia Kelly	3791 W M 113
009-010-00	Dorothy Weber	7305 S M 37
009-011-00	Weber Trust	7345 S M 37
009-013-00	Armond Snyder	7601 S M 37
009-014-00	Brad Vanwingerden	7525 S M 37

From Mayfield Township Zoning Administraton

Figure B-5

Property Map Mayfield Township, Grand Traverse County, Michigan.



ATTACHMENT C
WELL DATA AND CORRECTIVE ACTION PLAN

In addition to the presently permitted Weber #4-8 salt water disposal well, there are 4 other vertical penetrations of the proposed injection zone within the 1/4 mile Area of Review. Three of the wells were directionally drilled and this information is summarized below. The surface locations of all five wells and the subsurface locations of the three directionally drilled wells are shown Figure B-2.

Construction details for the Weber #4-8 saltwater disposal well are presented in Attachment "M". The other vertical well in the AOR is the Berry et al 1-8 (Permit #34147). Drilling started on this well in December 1980. After the hole was lost at 771', a cement plug was set and the well re-drilled to a depth of 6112'. The Berry et al 1-8 was plugged on December 10, 1982.

Construction and plugging records for Berry et al 1-8 and the other three wells drilled within the 1/4 mile Area of Review are included at the end of Attachment "C".

Directionally Drilled Wells Within AOR

Well Name & Number	Permit No.	Start Drilling	Drilling Completed	Total Depth	Status
Bott Berry 1-8	33597	03-16-80	03-31-80	6220	Plugged 10-06-80
Weber 3-8	34419	03-18-81	03-31-81	6273	Plugged 06-13-86
Berry 2-8	34594	05-16-81	05-25-81	6225	Plugged 02-06-86

Bott Berry #1-8 (Permit # 33597)

The Bott Berry #1-8 was drilled as a vertical well in March 1980. On April 1, 1980, cement plugs were set in the Bott Berry #1-8 (Permit # 33597) and the well directionally drilled. This directional drilling performed under Michigan Permit Number 33644 is summarized below:

Well Name & Number	Permit No.	Start Drilling	Drilling Completed	Total Depth	Status
Bott Berry 1-8A	33644	04-02-80	04-10-80	6310	Directionally drilled from 4416' to 6310' MD (4416' to 6208.6' TVD)

Cement Plugs:

Apr. 1, 1980 — 100 sacks spotted with open ended drill pipe at 6150'
200 sacks kick off plug spotted at 4850'.

Apr. 10, 1980 — 125 sacks spotted with open ended drill pipe at 6270'
240 sacks kick off plug spotted at 3850'.

Sep. 1980 — Removed 8 5/8" casing from 2904'. Spotted 75 sacks cement at 2945'. Spotted 75 sacks cement at 1831'. Spotted 100 sacks cement at 887'.

Weber #3-8 (Permit # 34419)

The Weber #3-8 was drilled as a vertical well in March 1981. On March 31, 1981, cement plugs were set in the Weber #3-8 (Permit # 34419) at three different times and the well directionally drilled. The following table summarizes this directional drilling which was performed under Michigan Permit Numbers 34489, 34506 and 34968.

Well Name & Number	Permit No.	Start Drilling	Drilling Completed	Total Depth	Status
Weber 3-8A	34489	04-01-81	04-07-81	6323'	Directionally drilled from 3736' to 6323' MD (3735.8' 6268.5 TVD)
Weber 3-8B	34506	04-09-81	04-16-81	6154	Directionally drilled from 3546' to 6154' MD (3545.8' to 6061.1 TVD)
Weber 3-8C	34968	09-10-81	09-17-81	6149	Directionally drilled from 3734' to 6149' MD (3734' to 6126' TVD)

Cement Plugs:

Mar. 1981 — 100 sacks spotted with open ended drill pipe at 6169'
250 sacks kick off plug spotted at 4089'

Apr. 1981 — 125 sacks spotted with open ended drill pipe at 6293'
250 sacks kick off plug spotted at 4030'

Sep. 1981 — Cement Retainer set 5840', 50 sacks cement under retainer & 30 sacks cement on top. Removed 5 ½" casing from 4418'. 165 sacks kick off plug from 4012' to 3550' On Sep. 17, 1981 ran 5 ½" to 6149' (MD) and cemented with 100 sacks of fill up and 200 sacks of good cement.

June 1986 — Cement Retainer set 6000', squeezed perfs. W/ 50 sacks cement under retainer & 50 sacks cement on top. Cut and pulled 5 ½". Spotted 75 sacks cement at 2600' and 75 sacks cement at 1700'. Spotted 75 sacks cement at 900'. Placed 15 sacks at surface. Cut off 3' below ground level and welded a ½" plate.

Bott Berry #2-8 (Permit # 34594)

The Bott Berry #2-8 was drilled as a vertical well in May 1981. On Jan. 11, 1983, cement plugs were set in the Bott Berry #2-8 (Permit # 34594) and the well directionally drilled. This directional drilling performed under Michigan Permit Number 36359 is summarized below:

Well Name & Number	Permit No.	Start Drilling	Drilling Completed	Total Depth	Status
Bott Berry 2-8A	36359	01-17-83	01-25-83	6063'	Directionally drilled from 4416' to 6310' MD (4416' to 6208.6' TVD)

Cement Plugs:

Jan. 11, 1983 Cement Retainer set 5950'. Perf. Would not take cement. Placed 50 sacks cement on top retainer. Cut and pulled 5 ½" at 4500'. Spotted 75 sacks cement at 2600' and 75 sacks cement at 1700'. Spotted 100 sacks as kick off plug.

Pages C-5 through C-7 list all non-fresh water artificial penetrations located in the Michigan Department of Natural Resources records for Sections 4, 5, 6, 7, 8, 9, 16, 17, and 18 of Township 25 North, Range 11 West, Grand Traverse County, Michigan.

Table C-1

All wells are located in Grand Traverse Co., T25N R11W
Bottom Hole Locations Grand Traverse Co., T25N R11W

API Well #	Permit #	Current Permittee	Well Name & #	Well Type	Well Status	Date Status	Field Name	Producing Formation	Directional?	SHL Sec	SHL QQQ	SHL Ft NS	SHL NS	SHL Ft EW	SHL EW	SHL From	BHL Sec	BHL QQQ	BHL Ft NS	BHL NS	BHL Ft EW	BHL EW	BHL From	Elev Gr	TD
21-055-31623-00-00	31623	SWEPI LP	FRASER & STATE MAYFIELD 3-4	Oil/Gas Well	Plugging Approved	7/23/1991	Mayfield 04 A - 25N - 11W	NIAGARAN	Vertical	4	NWSESW	861	S	1100	E	QTR								1048	6196
21-055-31732-00-00	31732	SWEPI LP	WEBER ET AL 4-4	Dry Hole	Plugging Approved	8/17/1977			Vertical	4	NWSENW	874	S	774	E	QTR								1062	6157
21-055-34338-00-00	34338	MACK OIL CORP AND NEYER OIL INC	UMLOR, JOSEPHINE ET AL 1-4	Dry Hole	Plugging Approved	8/8/1985			Vertical	4	SWNWSE	1300	N	520	W	QTR								1045	6210
21-055-33904-00-00	33904	SWEPI LP	WAGNER ET AL 5-4	Dry Hole	Plugging Approved	11/19/1980			Vertical	4	SENENW	735	N	460	E	QTR								1065	6125
21-055-33904-01-00	34034	SWEPI LP	WAGNER 5-4A	Dry Hole	Plugging Approved	10/25/1982			Directional	4	SENENW	735	N	460	E	QTR	4	SENENW	725	N	340	E	QTR	1065	6148
21-055-34186-00-00	34186	SWEPI LP	FRASER ET AL 6-4	Dry Hole	Plugging Approved	4/10/1981			Vertical	4	SENESW	859	N	456	E	QTR								1054	6222
21-055-36580-00-00	36580	APACHE CORP	WEBER JAY ET AL 2-4	Oil/Gas Well	Plugging Approved	7/11/1991	Mayfield 04 B - 25N - 11W	NIAGARAN	Vertical	4	CNSWNW	959	S	660	W	QTR								1062	6167
21-055-38061-00-00	38061	SWEPI LP	SCHMUCKAL ET AL 7-4	Dry Hole	Plugging Approved	8/8/1985			Vertical	4	NWNWSW	460	N	475	W	QTR								1057	6160
21-055-34186-01-00	34396	SWEPI LP	FRASER ET AL 6-4A	Dry Hole	Plugging Approved	4/10/1981			Directional	4	SENESW	859	N	456	E	QTR	4	SWNESW	847	N	867	E	QTR	1054	6157
21-055-34186-02-00	34408	LANTZ OIL COMPANY INC	FRASER ET AL 6-4B	Dry Hole	Plugging Approved	8/5/1983			Directional	4	SENESW	859	N	456	E	QTR	4	SENESW	964	N	500	E	QTR	1054	6000
21-055-33904-02-00	36107	SCHMUDE AND PANGBORN ASSOCIATES	WAGNER ET AL 1-4	Dry Hole	Plugging Approved	9/8/1983			Directional	4	SENENW	735	N	460	E	QTR	4	SWNENW	662	N	1193	E	QTR		6250
21-055-34186-03-00	36869	GREAT LAKES NIAGARAN INC	FRASER 6-4C	Oil/Gas Well	Plugging Approved	6/25/1985	Mayfield 04 A - 25N - 11W	NIAGARAN	Directional	4	SENESW	859	N	456	E	QTR	4	SWNESW	987	N	665	E	QTR	1054	5950
21-055-38091-00-00	38091	HALEX INC	WEBER & WAGNER 1-4	Dry Hole	Plugging Approved	6/25/1985			Directional	4	SWNENW	1250	N	876	E	QTR	4	SWNENW	1182	N	870	E	QTR	1063	6130
21-055-39038-00-00	39038	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	MCMANUS 1-4	Dry Hole	Plugging Approved	11/21/1985			Directional	4	SESWSE	376	S	1035	W	QTR	4	SWSWSE	432	S	570	W	QTR	1049	6363
21-055-30612-00-00	30612	REEF PETROLEUM CORP	MCMANUS, LYLE 1-4	Dry Hole	Plugging Approved	7/23/1976			Vertical	4	CNSE	1300	S	1265	W	QTR								1048	6246
21-055-36297-00-00	36297	C R J INC	ZENNER 1-5	Dry Hole	Plugging Approved	6/11/1986			Vertical	5	NESWNE	857	S	681	W	QTR								1088	6110
21-055-37828-00-00	37828	PENINSULAR OIL AND GAS CO	BIERMACHER UNIT 1-5	Location	Terminated Permit	6/7/1985			Vertical	5	NENENW	460	N	460	E	QTR									
21-055-38092-00-00	38092	SCHMUDE OIL CO	BANCROFT ET AL 1-5	Dry Hole	Plugging Approved	8/20/1985			Vertical	5	CNW2SE	1320	S	660	W	QTR								1090	6144
21-055-38800-00-00	38800	MACK OIL CORP	HARPE & ZENNER 2-5	Location	Terminated Permit	3/13/1986			Vertical	5	SWNESW	1150	N	847	E	QTR									
21-055-39125-00-00	39125	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	ZENNER & BIERMACHER 3-5	Dry Hole	Plugging Approved	11/21/1985			Vertical	5	NWNWNE	650	N	150	W	QTR								1086	6100
21-055-40326-00-00	40326	MACK OIL CORP	CALL 4-5	Location	Terminated Permit	2/10/1988			Vertical	5	SENWNW	1000	N	750	W	QTR									
21-055-37213-00-00	37213	FEDERATED NATURAL RESOURCES CORP	WEBER 1-5	Dry Hole	Plugging Approved	5/31/1984			Directional	5	SENENE	1279	N	460	E	QTR	5	SESENE	567	S	490	E	QTR	1067	6230
21-055-30860-00-00	30860	SWEPI LP	ZENNER ET AL 1-5	Dry Hole	Plugging Approved	7/28/1976			Vertical	5	SENWNE	962	N	1307	W	QTR								1078	6091
21-055-32338-00-00	32338	REEF PETROLEUM CORP AND NEYER OIL INC	KREISER, RALPH TRUST 1-5	Dry Hole	Plugging Approved	6/20/1978			Vertical	5	NENWSW	555	N	860	W	QTR								1096	6113
21-055-33698-00-00	33698	MACK OIL CORP	COURTADE ET AL 1-5	Dry Hole	Plugging Approved	7/14/1980			Vertical	5	NWSESE	800	S	700	E	QTR								1079	6180
21-055-34161-00-00	34161	MACK OIL CORP	BELL ET AL 1-5	Oil/Gas Well	Plugging Approved	10/25/1982	Mayfield 04 A - 25N - 11W	NIAGARAN	Vertical	5	SESESE	369	S	330	E	QTR								1088	5915
21-055-33698-01-00	33787	MACK OIL CORP	COURTADE ET AL 1-5A	Dry Hole	Plugging Approved	8/14/1980			Directional	5	NWSESE	800	S	700	E	QTR	5	SWNESE	1275	N	687	E	QTR	1079	6230
21-055-29938-00-00	29938	SWEPI LP	BANCROFT KREISER 2-6	Dry Hole	Plugging Approved	12/5/1974			Vertical	6	SESESE	510	S	0	E	QTR								1088	6129
21-055-32614-00-00	32614	TRAVERSE CORP	BANCROFT ET AL 1-6	Dry Hole	Plugging Approved	8/8/1979			Directional	6	SESESE	545	S	620	E	QTR	6	SWSESE	506	S	834	E	QTR	1074	6125
21-055-38990-00-00	38990	MACK OIL CORP	BANCROFT 2-6	Dry Hole	Plugging Approved	5/1/1986			Vertical	6	NWNESE	500	N	662	E	QTR								1060	6085
21-055-56336-00-00	56336	JORDAN DEVELOPMENT CO LLC	BANCROFT 1-7 HD	Location	Terminated Permit	8/23/2006			Horizontal	6	SESESE	88	S	122	E	SEC	7	SWSESE	660	S	850	E	SEC		
21-055-35790-00-00	35790	MUSKEGON DEVELOPMENT CO	WEBER & KREISER 1-7	Dry Hole	Plugging Approved	12/2/1983			Vertical	7	SWSWNE	600	S	460	W	QTR								1094	6166
21-055-37825-00-00	37825	FEDERATED NATURAL RESOURCES CORP	BANCROFT & MILLER 1-7	Dry Hole	Plugging Approved	11/29/1984			Vertical	7	NENENE	500	N	125	E	QTR								1075	6158
21-055-37947-00-00	37947	MACK OIL CORP	YANSKA 2-7	Dry Hole	Plugging Approved	6/25/1985			Vertical	7	NESESE	840	S	600	E	QTR								1047	6208
21-055-38474-00-00	38474	MACK OIL CORP	WEBER & YANSKA 3-7	Dry Hole	Plugging Approved	8/8/1985			Vertical	7	NWSENE	776	S	1087	E	QTR								1059	6176
21-055-33669-02-00	40241	MACK OIL CORP	YANSKA 1-7B	Dry Hole	Plugging Approved	11/24/1987			Directional	7	SESWSE	540	S	1290	W	QTR	18	NWNENE	184	N	1120	E	QTR	1021	6222
21-055-33669-00-00	33669	EASON OIL CO	YANSKA 1-7	Dry Hole	Plugging Approved	6/9/1980			Vertical	7	SESWSE	540	S	1290	W	QTR								1021	6195
21-055-30482-00-00	30482	SWEPI LP AND EASON OIL CO	YANSKA ET AL 1-7	Location	Terminated Permit	1/17/1976			Directional	7	NESESE	700	S	550	E	QTR	7	SESESE	150	S	510	E			
21-055-33669-01-00	33759	MACK OIL CORP	YANSKA 1-7A	Oil/Gas Well	Plugging Approved	3/4/1987	Mayfield 07 - 25N - 11W	NIAGARAN	Directional	7	SESWSE	540	S	1290	W	QTR	7	SWSESE	355	S	1031	E	QTR	1021	6166
21-055-34594-01-00	36359	GREAT LAKES NIAGARAN INC	BERRY ET AL 2-8A	Oil/Gas Well	Plugging Approved	10/3/1991	Mayfield 08 - 25N - 11W	NIAGARAN	Directional	8	NESWNE	854	S	825	W	QTR	8	NESWNE	987	S	744	W	QTR	1089	6085

TABLE C-1 (CONTINUED)

21-055-38441-00-00	38441	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	ZIMMERMAN 1-8	Dry Hole	Plugging Approved	3/5/1985			Directional	8	SWSESW	370	S	675	E	QTR	8	SWSESW	345	S	678	E	QTR	1067	6305
21-055-38441-01-00	38689	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	ZIMMERMAN 1-8A	Dry Hole	Plugging Approved	5/1/1986			Directional	8	SWSESW	357	S	675	E	QTR	8	SESWSW	343	S	1312	W	QTR	1067	6405
21-055-30609-00-00	30609	EASON OIL CO	HORTON, RONALD L & BEVERLY S ET AL 1-8	Location	Terminated Permit	3/26/1976			Vertical	8	SESWSE	550	S	860	W	QTR									
21-055-31343-00-00	31343	SWEPI LP	GRANT FARMS & CASSELL 1-8	Dry Hole	Plugging Approved	5/3/1977			Vertical	8	SWSWSW	375	S	580	W	QTR								1092	6310
21-055-31443-00-00	31443	MILLER BROTHERS	WOLF, STANLEY ET AL 2-8	Dry Hole	Plugging Approved	5/16/1977			Vertical	8	SWNESE	812	N	1000	E	QTR								1055	6290
21-055-54776-00-00	54776	MACK OIL CORP	MILLER-HARPE 1-8	Dry Hole	Plugging Approved	9/10/2002			Directional	8	NWNENW	300	N	1886	W	SEC	5	SWSESW	146	S	1787	W	SEC	1109	6250
21-055-33597-00-00	33597	TRAVERSE CORP	BOTT BERRY 1-8	Dry Hole	Plugging Approved	4/30/1980			Vertical	8	NWSWNE	814	S	320	W	QTR								1068	6220
21-055-34047-00-00	34047	TRAVERSE OIL CO	BOTT 3-8	Dry Hole	Plugging Approved	11/21/1980			Vertical	8	SESENW	200	S	460	E	QTR								1075	6250
21-055-34147-00-00	34147	GREAT LAKES NIAGARAN INC	BERRY ET AL 1-8	Oil/Gas Well	Plugging Approved	6/29/1983	Mayfield 08 - 25N - 11W	NIAGARAN	Vertical	8	NESWNE	839	S	700	W	QTR								1085	6110
21-055-34419-00-00	34419	TRAVERSE OIL CO	WEBER 3-8	Dry Hole	Plugging Approved	5/20/1981			Vertical	8	SENWNE	854	N	1140	W	QTR								1093	6283
21-055-34594-00-00	34594	GREAT LAKES NIAGARAN INC	BERRY ET AL 2-8	Oil/Gas Well	Plugging Approved	6/29/1983	Mayfield 08 - 25N - 11W	NIAGARAN	Vertical	8	NESWNE	854	S	825	W	QTR								1089	6225
21-055-34747-00-00	34747	TRAVERSE OIL CO	WEBER BDW 1-8	Location	Terminated Permit	7/8/1982			Vertical	8	NENWNE	654	N	1140	W	QTR									
21-055-33792-00-00	33792	TRAVERSE CORP	BOTT BERRY ET AL 2-8	Dry Hole	Plugging Approved	11/3/1980			Vertical	8	SESWNE	0	S	770	W	QTR								1095	6285
21-055-38725-00-00	38725	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	BOTT 1-8	Dry Hole	Plugging Approved	5/15/1986			Vertical	8	SENWSW	660	N	1276	W	QTR								1073	6896
21-055-33597-01-00	33644	TRAVERSE CORP	BOTT BERRY 1-8A	Dry Hole	Plugging Approved	10/6/1980			Directional	8	NWSWNE	814	S	320	W	QTR	8	CNSWNE	627	S	625	W	QTR	1068	6310
21-055-34419-01-00	34489	TRAVERSE OIL CO	WEBER 3-8A	Dry Hole	Plugging Approved	5/20/1981			Directional	8	SENWNE	854	N	1140	W	QTR	8	SWNWNE	817	N	600	W	QTR	1093	6320
21-055-34419-02-00	34506	TRAVERSE OIL CO	WEBER 3-8B	Dry Hole	Plugging Approved	12/2/1981			Directional	8	SENWNE	854	N	1140	W	QTR	8	SENENE	800	N	579	E	QTR	1093	6154
21-055-34419-03-00	34968	MOSBACHER ENERGY CO	WEBER 3-8C	Oil/Gas Well	Plugging Approved	7/16/1986	Mayfield 08 - 25N - 11W	NIAGARAN	Directional	8	SENWNE	854	N	1140	W	QTR	8	SENWNE	884	N	800	W	QTR	1094	6149
21-055-38725-01-00	38725	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	BOTT 1-8	Dry Hole	Plugging Approved	5/15/1986			Vertical	8	SENWSW	660	N	1276	W	QTR								1073	
21-055-34853-00-00	34853	WEST BAY EXPLORATION CO	MILLER 1-8	Location	Terminated Permit	8/3/1982			Vertical	8	SWNENW	856	N	1000	E	QTR									
21-055-36221-00-00	36221	TEAM COMPLETIONS LLC	WEBER 4-8 SWD	Brine Disposal Well	Active	1/10/2005			Vertical	8	SWNENE	1115	N	1209	E	QTR								1105	2200
21-055-37619-00-00	37619	CONTINENTAL COASTAL CO AND WARD M HAGGARD OIL	BOTT 6-8	Location	Terminated Permit	2/15/1985			Vertical	8	SENWSW	660	N	900	W	QTR									
21-055-44605-00-00	44605	TOLAS OIL AND GAS EXPLORATION CO	MILLER ET AL 1-8	Dry Hole	Plugging Approved	8/18/1997			Vertical	8	NWNENW	650	N	1315	E	QTR								1108	6200
21-055-38877-00-00	38877	SWEPI LP INC AND PETROSTAR ENERGY	HARRAND 7-9	Dry Hole	Plugging Approved	8/1/1985			Vertical	9	NENWSE	161	N	775	W	QTR								1060	6410
21-055-32410-01-00	32797	MOSBACHER ENERGY CO	ZIMMERMAN, JACK 1-9A	Oil/Gas Well	Plugged Back		Mayfield 04 A - 25N - 11W	NIAGARAN	Directional	9	NENWNW	330	N	700	W	QTR	9	NENWNW	343	N	380	W	QTR	1067	5920
21-055-36677-00-00	36677	LANTZ OIL COMPANY INC	WEBER 1-9	Dry Hole	Plugging Approved	6/13/1983			Directional	9	SWSESE	460	S	737	E	QTR	9	SESESE	485	S	474	E	QTR	1075	6513
21-055-36677-01-00	36737	LANTZ OIL COMPANY INC	WEBER 1-9A	Dry Hole	Plugging Approved	9/8/1983			Directional	9	SWSESE	460	S	737	E	QTR	9	SESESE	366	S	336	E	QTR	1076	6530
21-055-38877-01-00	39116	SWEPI LP INC AND PETROSTAR ENERGY	HARRAND 7-9A	Dry Hole	Plugging Approved	8/8/1985			Directional	9	NENWSE	161	N	775	W	QTR	9	SESWNE	469	S	752	W	QTR		6509
21-055-38877-02-00	39143	SWEPI LP INC AND PETROSTAR ENERGY	HARRAND 7-9B	Dry Hole	Plugging Approved	5/7/1986			Directional	9	NENWSE	161	N	775	W	QTR	9	SENWSE	707	N	847	W	QTR	1060	6523
21-055-29224-00-00	29224	SWEPI LP	ZIMMERMAN 1-9	Oil/Gas Well	Plugging Approved	9/28/1976	Mayfield 09 - 25N - 11W	NIAGARAN	Vertical	9	NWNWNW	550	N	330	W	QTR								1075	6345
21-055-29520-00-00	29520	SWEPI LP	ZIMMERMAN 2-9	Dry Hole	Plugging Approved	3/12/1975			Vertical	9	S2NESW	946	N	697	E	QTR								1069	6410
21-055-29520-01-00	31606	MILLER BROTHERS	ZIMMERMAN, JACK 2-9	Dry Hole	Plugging Approved	10/18/1977			Vertical	9	S2NESW	946	N	697	E	QTR								1069	6410
21-055-30849-00-00	30849	SWEPI LP	SNYDER ET AL 3-9	Dry Hole	Plugging Approved	7/6/1978			Vertical	9	SENWSW	1060	N	870	W	QTR								1083	6205
21-055-31047-00-00	31047	SWEPI LP	HARRAND ET AL 4-9	Dry Hole	Plugging Approved	8/12/1976			Vertical	9	SENESE	1050	N	500	E	QTR								1072	6450
21-055-31615-00-00	31615	M G U DEVELOPMENT CO	SNYDER, ARMOND ET AL 1-9	Dry Hole	Plugging Approved	5/31/1977			Vertical	9	NENWSW	460	N	872	W	QTR								1063	6300
21-055-32410-00-00	32410	REEF PETROLEUM CORP	ZIMMERMAN, JACK 1-9	Dry Hole	Plugging Approved	5/16/1990			Vertical	9	NENWNW	330	N	700	W	QTR								1067	6010
21-055-33935-00-00	33935	SWEPI LP	WEBER-SHEREN 5-9	Dry Hole	Plugging Approved	9/9/1981			Vertical	9	SESWSE	521	S	1185	W	QTR								1077	6470
21-055-33985-00-00	33985	HOBSON PETROLEUM CORP	WEBER 1-9	Dry Hole	Plugging Approved	10/13/1980			Vertical	9	N2SWNW	990	S	660	W	QTR								1054	6300
21-055-34614-00-00	34614	MACK OIL CORP	HARRAND 1-9	Dry Hole	Plugging Approved	10/25/1982			Vertical	9	NWNESE	150	N	872	E	QTR								1069	6450
21-055-34132-01-00	34132	SWEPI LP	WEBER-SHEREN 6-9	Dry Hole	Plugging Approved	5/15/1986			Vertical	9	SWSWSE	460	S	460	W	QTR									
21-055-29520-02-00	31851	WHITING OIL AND GAS CORP	ZIMMERMAN 2-9A	Oil/Gas Well	Producing		Mayfield 09 - 25N - 11W	NIAGARAN	Directional	9	S2NESW	946	N	697	E	QTR	9	NWSESW	1233	N	866	E	QTR	1069	6445
21-055-30849-01-00	33290	CONOCO INC	SNYDER ET AL 5-9	Oil/Gas Well	Plugging Approved	7/18/1995	Mayfield 09 - 25N - 11W	NIAGARAN	Directional	9	SENWSW	1060	N	870	W	QTR	9	SENWSW	980	N	960	W	QTR	1083	6300
21-055-34132-00-00	34132	SWEPI LP	WEBER-SHEREN 6-9	Dry Hole	Plugging Approved	5/15/1986			Vertical	9	SWSWSE	460	S	460	W	QTR								1086	8476
21-055-36968-00-00	36968	MAJOR OIL CORP	CLOUS 1-9	Location	Terminated Permit	8/19/1984			Vertical	9	SWNENE	700	N	875	E	QTR									

TABLE C-1 (CONTINUED)

21-055-38440-00-00	38440	H AND H STAR ENERGY INC DBA PETROSTAR ENERGY	CLOUS 1-9	Dry Hole	Plugging Approved	7/11/1985			Vertical	9	SWNENE	1000	N	800	E	QTR								1054	6370
21-055-29520-03-00	31851	WHITING OIL AND GAS CORP	ZIMMERMAN 2-9A HD1	Oil/Gas Well	Producing	6/1/2004			Horizontal	9	SWNESW	1683	S	1939	W	SEC	16	NWNWNW	78	N	431	W	SEC		
21-055-29520-04-00	31851	WHITING OIL AND GAS CORP	ZIMMERMAN 2-9A HD2	Location	Terminated Permit				Horizontal	9	SWNESW	1683	S	1939	W	SEC	9	NWSWSW	850	S	330	W	SEC		
21-055-36032-02-00	36734	DISCOVERY OIL CO	ZIMMERMAN 1-16B	Dry Hole	Plugging Approved	5/31/1984			Directional	16	E2E2NW	1320	N	460	E	QTR	16	NESENW	941	S	331	E	QTR	1106	6565
21-055-29979-02-00	40757	PETRO HUNT INC OF KENTUCKY AND TENEXCO INC	BAUER & WALTON 1-16	Dry Hole	Plugging Approved	7/20/1988			Directional	16	SWSENW	585	S	861	E	QTR	16	NWNWSW	597	N	475	W	QTR	1121	6796
21-055-41764-00-00	41764	TERRA ENERGY LTD	ZIMMERMAN 11-16	Dry Hole	Plugging Approved	11/7/1989			Directional	16	NESENW	860	S	100	E	QTR	16	NESENW	863	S	235	E	QTR	1108	7090
21-055-29979-00-00	29979	SWEPI LP	GRANT FARMS ZIMMERMAN ET AL 5-16	Dry Hole	Plugging Approved	8/16/1976			Vertical	16	SWSENW	585	S	863	E	QTR								1121	6544
21-055-31488-00-00	31488	SWEPI LP	KLEE ET AL 9-16	Dry Hole	Plugging Approved	7/21/1977			Vertical	16	NESWNW	681	S	856	W	QTR								1111	6489
21-055-31519-00-00	31519	SWEPI LP	BAUER MILOWSKI 8-16	Dry Hole	Plugging Approved	5/1/1987			Vertical	16	NWNWNW	333	N	634	W	QTR								1108	6350
21-055-31519-01-00	31588	SWEPI LP	BAUER MIKOWSKI ET AL 8-16A	Dry Hole	Plugging Approved	6/15/1978			Directional	16	NWNWNW	333	N	634	W	QTR	16	NWNWNW	14	N	457	W	QTR	1108	6348
21-055-31784-00-00	31784	SWEPI LP	BAUER & MIKOWSKI ET AL 8-16B	Oil/Gas Well	Plugging Approved	10/6/2000	Mayfield 09 - 25N - 11W	NIAGARAN	Directional	16	NWNWNW	333	N	614	W	QTR	16	SWSWSW	231	S	302	W	QTR	1108	6348
21-055-36032-00-00	36032	SCHMUDE AND PANGBORN ASSOCIATES	ZIMMERMAN ET AL 1-16	Dry Hole	Plugging Approved	5/26/1983			Vertical	16	E2E2NW	1320	N	460	E	QTR								1110	6530
21-055-36422-00-00	36422	SCHMUDE AND PANGBORN ASSOCIATES	ZIMMERMAN ET AL 2-16	Dry Hole	Plugging Approved	12/2/1983			Vertical	16	SESENW	550	S	330	E	QTR								1119	6544
21-055-38552-00-00	38552	MURPHY OIL CO AND NEYER OIL CO	ZIMMERMAN 1-16	Location	Terminated Permit	8/9/1985			Vertical	16	NENENW	520	N	460	E	QTR									
21-055-39487-00-00	39487	MANITOU EXPLORATION CO INC	ZIMMERMAN 1-16	Dry Hole	Plugging Approved	6/18/1986			Vertical	16	NENENW	520	N	460	E	QTR								1096	6772
21-055-29979-01-00	40511	PETRO HUNT INC OF KENTUCKY AND TENEXCO INC	ZIMMERMAN 5-16A	Dry Hole	Plugging Approved	11/24/1987			Directional	16	SWSENW	585	S	861	E	QTR	16	SWSENW	173	S	953	E	QTR	1121	6568
21-055-36032-01-00	36158	DISCOVERY OIL CO	ZIMMERMAN ET AL 1-16A	Dry Hole	Plugging Approved	6/1/1983			Directional	16	E2E2NW	1320	N	460	E	QTR	16	NESENW	835	S	356	E	QTR	1110	6610
21-055-29791-00-00	29791	MERIT ENERGY CO	WOLF & OLSZEWSKI 2-17	Oil/Gas Well	Producing		Mayfield 17 - 25N - 11W	NIAGARAN	Vertical	17	NWSWNE	846	S	116	W	QTR								1111	6320
21-055-30426-00-00	30426	EASON OIL CO	MCDERMOTT, ROBT & D, & HORTON, R & B ET AL 1	Dry Hole	Plugging Approved	8/25/1975			Vertical	17	S2NWNE	854	N	660	W	QTR								1095	6380
21-055-32026-00-00	32026	MERIT ENERGY CO	CASSELL ET AL 5-17	Oil/Gas Well	Plugging Completed	2/23/2007	Mayfield 17 - 25N - 11W	NIAGARAN	Vertical	17	SESWNW	330	S	989	W	QTR								1036	6175
21-055-35822-00-00	35822	KEP EXPLORATION INC	OLSZEWSKI 1-17	Dry Hole	Plugging Approved	10/25/1982			Vertical	17	SENENW	985	N	330	E	QTR								1046	6291
21-055-36296-00-00	36296	MUSKEGON DEVELOPMENT CO	MCDERMOTT & HORTON 1 17	Dry Hole	Plugging Approved	6/16/1983			Vertical	17	SWNWNE	984	N	330	W	QTR								1091	6375
21-055-40831-00-00	40831	SWEPI LP	FOX 7-17	Dry Hole	Plugging Approved	3/8/1988			Directional	17	SESENW	203	S	164	E	QTR	17	NENESW	78	N	348	E	QTR	1108	6469
21-055-40831-01-00	40888	MERIT ENERGY CO	FOX 7-17A	Oil/Gas Well	Producing		Mayfield 17 - 25N - 11W	NIAGARAN	Directional	17	SESENW	203	S	164	E	QTR	17	SWSENW	190	S	778	E	QTR	1108	6628

APR 30 1980

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES APR 25 1980

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in **DUPLICATE** Within 30 Days after Well Completion

PERMIT NUMBER: 33597

DEEPENING PERMIT NUMBER:

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
Traverse Corporation
P. O. Box 1036
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Cedco Drilling Co. RIG #21
P. O. Box 36
Gaylord, MI 49735

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT: Bott Berry #1-8

DIRECTIONALLY DRILLED: YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NW SW NE	8	25N	11W	Mayfield

FOOTAGES: 814 Ft. from South (North/South) Line and 320' Ft. from West (East/West) Line of quarter section

COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME

FOOTAGES: _____ Ft. from _____ (North/South) Line and _____ Ft. from _____ (East/West) Line of quarter section

COUNTY NAME:

DATE	DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
	3-16-80	Driller 6220' Log 6213'	DRY HOLE		
	DRILLING COMPLETED: 3-31-80	FORMATION AT T.D.: Niagaran	FT. DRLD. – ROTARY TOOLS From 0 To T.D.	K.B. 1083'	R.F.
	WELL COMPLETED: 4-1-80	PRODUCING FORMATION(S): NONE	FT. DRLD. – CABLE TOOLS From _____ To _____	R.T. 1082'	Grd. 1067.9'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16"	68'	NONE	NONE
11 3/4"	830'	450 sx	NONE
8 5/8"	3346'	240 sx	NONE

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

DEPTH CORRECTION

DEVIATION SURVEY

PLUGGED BACK

Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
Schlumberger	X	CNL/FDC	200-6212'							
Birdwell		DLL	5661-6197'							
OTHER										

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. WITHIN MY KNOWLEDGE ALL FACTS ARE TRUE AND COMPLETE.

DATE	TITLE	SIGNATURE
4-23-80	G. W. Walker, Vice President - Exploration	G W Walker

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE R - 7210

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1083' K.B.	Darrell L. Potter	☐ DRILLERS LOG ☒ SAMPLE LOG ☒ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
740		Base of the Drift
1472		Antrim
1712		Traverse Formation
1780		Traverse Lime → long string casing cement ends @ 2222' (within Traverse Lime)
2331		Bell Shale
2435		Dundee
2643		Detroit River Formation
2659		Detroit River Salt
3280		Base of Salt
3733		Bois Blanc
4122		Bass Island
4416		SALINA "G"
4449		F Unit
4482		F Salt
5079		E Unit
5200		D Unit
5226		C Shale
5305		B Unit
5333		B Salt
5742	5830	A2 Carb (dol., lt/m.gy-brn., vfxln, w/pels, f.suc.)
[illegible]D	5868	Dol., lt/m.gy-brn., vfxln, anhydritic
5868	5894	A-1 Evaporite (Salt)
5894	5970	Anhy.
5970	6075	A1 Carb (Dol., lt/m.brn., vfxln, arg. carb.)
6075	6115	A1 Evap (Anhy.)
6115	6176	Reef (Dol., lt/m.brn, vfxln, f.intxln por., no fluor.)
6176	6213	Gray Niagaran (Dol., m.gy-brn. arg. bcm. m.gy. arg.)
6213		T.D. - DRY & ABANDONED

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

APR 25 1980

Page C-10

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 33597

FIELD NAME:

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Traverse Corporation, P. O. Box 1036, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S): Bott Berry

WELL NUMBER: #1-8

WELL LOCATION: NW ¼ SW ¼ NE ¼ SEC. 8 T.25N R. 11W

TOWNSHIP: Mayfield

COUNTY: G. Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): DRY HOLE

TOTAL DEPTH: 6220'

FORMATION: Niagaran

DATE PLUGGING STARTED: 3-31-80

DATE PLUGGING COMPLETED: 4-1-80

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Wm. Booker

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16"	68'	NONE	
11 3/4"	830'	NONE	
8 5/8"	3346'	NONE	

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
CEMENT	6150'	100 sx
CEMENT	4850'	200 sx
	(Kickoff Plug)	

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO
If yes, give details: 16" from 0 to 68' 11 3/4" from 0 to 830' 8 5/8" from 0 to 3346'

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO
If yes, give name and address: Allied Cementing, Mt. Pleasant, MI 48858

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO
If yes, give name and address: Cedco Drilling Company Rig #21, Gaylord, MI 49735

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Forest Rosborough

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED: Went in hole with drill pipe open ended to 6150' and spotted 100 sacks of cement. Came up the hole to 4850' and spotted 200 sacks of cement for kickoff plug.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"I state that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction, and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): G. W. Walker, Vice President - Exploration

SIGNATURE: G W Walker

DATE (Month, Day, Year): 4-23-80

COMPANY NAME AND ADDRESS: Traverse Corporation, P. O. Box 1036, Traverse City, MI 49684

R 7213

OPERATORS USE

Description of Detail (cont.) or Other Supplemental Data:

DEPARTMENT USE ONLY

Supplemental Plugging Data and Site Conditions:

4/30/80 All records in. Hole was directionally drilled by PN-33645 Bott-Berry 1-8A. OK for G.S. approval.

J. Snider

FINAL INSPECTIONS BY DEPARTMENT REPRESENTATIVES

SIGNATURE	DIVISION	DATE
John R. Snider	Geology	4/30/80

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

MAY 2 1980

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in **DUPLICATE** Within 30 Days after Well Completion

PERMIT NUMBER: 33644

DEEPENING PERMIT NUMBER:

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
Traverse Corporation
P. O. Box 1036
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Cedco Drilling Company Rig #21
P. O. Box 36
Gaylord, MI 49735

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT
Bott Berry #1-8A

DIRECTIONALLY DRILLED YES ☒ NO ☐

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NW SW NE	8	25N	11W	Mayfield

FOOTAGES: 814 Ft. from South Line and 320 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SW SW NE	8	25N	11W	Mayfield

FOOTAGES: 634 Ft. from South Line and 600' Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

DATE				
DRILLING BEGUN: 4-2-80	TOTAL DEPTH OF WELL: Driller 6310' Log 6306'	TYPE WELL: DRY HOLE	ELEVATIONS	
DRILLING COMPLETED: 4-9-80	FORMATION AT T.D.: Niagaran	FT. DRLD. – ROTARY TOOLS: From 0 To T.D.	K.B.: 1083'	R.F.:
WELL COMPLETED: 4-10-80	PRODUCING FORMATION(S): NONE	FT. DRLD. – CABLE TOOLS: From ____ To ____	R.T.: 1082'	Grd.: 1067.9'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
No casing set - well kicked off from Bott Berry #1-8 Permit #33597			

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN — DEPTH CORRECTION — DEVIATION SURVEY — PLUGGED BACK

Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
Schlumberger	X	FDC/CNL/GR	4400-6306'	See Oil Well Drilling Control report attached.						
Birdwell										
OTHER										

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
4-29-80	G. W. Walker, Vice President-Exploration	G W Walker

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE R - 7210

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1190' K.B.	G. W. Walker	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)		FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.						
4416' MD		Salina G	4416' TVD			
4450' MD		F Unit	4450' TVD			
4482' MD		F Salt	4482' TVD			
5090' MD		E Unit	5084.8' TVD			
5214' MD		D Unit	5201.5' TVD			
5229' MD		D Salt	5216.7' TVD			
5243' MD		C Shale	5229.6' TVD			
5324' MD		B Unit	5308.1' TVD			
5354' MD		B Salt	5337.13' TVD			
5769' MD		A2 Carb	5738.6' TVD	(Dol., lt-m.brn, vfxln, hd,dns, w/some pels)		
5892' MD		A2 Evap	5858.5' TVD	(Salt 5892-5985'; Anhy. 5985-6002')		
6002' MD		A1 Carb	5965.9' TVD	(Dol., lt-m.brn, vfxln, hd, anhydte, arg.)		
6135' MD		A1 Evap	6095.1' TVD	(Anhy, wh.)		
6171' MD		Reef	6130.3' TVD	(Dol., buf-tan-lt.brn, vfxln, f-g intr xln por. wk.fluor.)		
6251' MD		Gray Niagaran	6208.6' TVD	(Dol, lt.gry, vfxln, hd,dns,arg.)		
6310' MD		T.D. - Dry & Temporarily Abandoned				

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

SEP 25 1980

OCT 6 19

LANSING HAS COPY

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 33644

FIELD NAME:

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Traverse Corporation, P. O. Box 1036, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S): Bott Berry

WELL NUMBER: #1-8A

WELL LOCATION: NW ¼ SW ¼ NE ¼ SEC. 8 T. 25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): DRY HOLE

TOTAL DEPTH: 6310'

FORMATION: Niagaran

DATE PLUGGING STARTED: 9-22-80

DATE PLUGGING COMPLETED: 9-22-80

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Wm. Booker

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
No casing set - well	kicked off from		
Bott Berry #1-8 well	Permit #33597		

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
CEMENT	6270	125 SX
CEMENT	3850	240 SX
Kickoff plug -	temporarily	abandoned

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO

If yes, give details: 16" from 0 to 68'; 11 3/4" from 0 to 830
8 5/8" from 2904-3346'

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO

If yes, give name and address: Halliburton
Kalkaska, Michigan

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO

If yes, give name and address: Pool
Kalkaska, Michigan

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Mike Babcock

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED: Rigged up casing crew. Rigged up McCullough and ran free-point test. Found 8 5/8" casing free at 2920'. Shot off 8 5/8" casing at 2904'. Pulled out of hole. Rigged down casing crew. Rigged up Halliburton. Ran 2 7/8" tubing in hole open ended to 2945' and spotted 75 sacks of cement. Pulled up the hole to 1831' and spotted 75 sacks of cement. Pulled up the hole to 887' and spotted 100 sacks of cement. Pulled tubing out of the hole. Cut 11 3/4" casing 3' below ground level and welded on steel plate. 4/10/80 went in hole w/drill pipe open-ended to 6270' and spotted 125 sx of cmt. Came up the hole to 3850 and spotted 240 sx of cmt. for kick off plug.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"...e that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direc-...and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Christopher B. Keister, Geologist

SIGNATURE: Christopher B Keister

DATE (Month, Day, Year): 9-24-80

COMPANY NAME AND ADDRESS:
Traverse Corporation
P. O. Box 1036
Traverse City, MI 49684

STATE OF MICHIGAN
DEPARTMENT OF [illegible]URAL RESOURCES

LOG OF OIL, GAS, DISPOSA[illegible]OR STORAGE WELL (ACT 61)

Submit in DUPLICATE Within 30 Days after Well Completion

PERMIT NUMBER 34147 AUG 25 1983

DEEPENING PERMIT NUMBER

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
[redacted]reat Lakes Niagaran Lost Hole -
[redacted]and Industrial Natural Gas Skidded Rig
P.O Box 227, Traverse City, Michigan 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
L & G 2

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT
[redacted]

DIRECTIONALLY DRILLED YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NE SW NE	8	25N	11W	Mayfield

FOOTAGES (North/South) 854 Ft. from S Line and (East/West) 700 Ft. from W Line of quarter section

COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME

FOOTAGES (North/South) ____ Ft. from ____ Line and (East/West) ____ Ft. from ____ Line of quarter section

COUNTY NAME:

DATE

DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
12/10/80	Driller 771 Log ____	Lost Hole Dry & Abandon		
DRILLING COMPLETED 12/11/80	FORMATION AT T.D. Drift	FT. DRLD. – ROTARY TOOLS From 0 To 871	K.B. 1098	R.F.
WELL COMPLETED 12/11/80	PRODUCING FORMATION(S)	FT. DRLD. – CABLE TOOLS From ____ To ____	R.T.	Grd.

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16	77	Driven	
11 3/4	562	Lost Hole	60'

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

DEPTH CORRECTION

DEVIATION SURVEY

PLUGGED BACK

Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
Schlumberger										
Birdwell										
OTHER										

PRODUCTION TEST DATA

[illegible] – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
1-26-81	Darrell L. Potter, Geologist	Darrell L. Potter

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

EVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
KB	Darrell L. Potter	[x] DRILLERS LOG [x] SAMPLE LOG [ ] ELECTRIC LOG

FRO	TO	FORMATION (TYPE, COLOR, HARDNESS)
TE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL PTH FORMATION TOPS WHERE APPROPRIATE.		
0	771	Drift Lost Hole - Casing stuck at 562 - skidded rig
771	871	Coldwater shale
871		Total Depth

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SUR / DIVISION

Lost Hole - Skidded Rig

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 34147

FIELD NAME: None

AUG 25 1983

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER: Great Lakes Niagaran & Industrial Natural Gas, P O Box 227, Traverse City, Michigan 49684

COMPLETE LEASE OR FARM NAME(S): [redacted]al

WELL NUMBER: [redacted]8

WELL LOCATION: NE ¼ SW ¼ NE ¼ SEC. 08 T. 25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): Dry Hole - Lost Hole

TOTAL DEPTH: 871

FORMATION: Drift

DATE PLUGGING STARTED: 12/11/80

DATE PLUGGING COMPLETED: 12/11/80

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Al Walton

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16	77	None	None
11 3/4	562	60'	Shot

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
Cement	Top 16"	25 Sacks

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO — If yes, give details: 11 3/4" casing 60'-562

Did a Service Company pump mud, spot cement, or set bridge plugs? [ ] YES [X] NO — If yes, give name and address:

Was the well plugged by a Company or Contractor other than Owner or Operator? [ ] YES [X] NO — If yes, give name and address:

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging:

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED: 25 sacks cement in top of 16"

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

I state that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction, and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Darrell L. Potter, Consulting Geologist

SIGNATURE: Darrell L. Potter

DATE (Month, Day, Year): 1/26/81

COMPANY NAME AND ADDRESS: Great Lakes Niagaran, P O Box 227, Traverse City, Michigan 49684

R 7213

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in DUPLICATE Within 30 Days after Well Completion

PERMIT NUMBER 47 (34147)
DEEPENING PERMIT NUMBER

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT	NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Great Lakes Niagaran P O Box 227 Traverse City, Michigan 49684	L & G Rig 2

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT: Berry et al 1-8

DIRECTIONALLY DRILLED: YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NESWNE	8	25N	11W	Mayfield

FOOTAGES (North/South) 854 Ft. from S Line and (East/West) 700 Ft. from W Line of quarter section

COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME

FOOTAGES (North/South) _____ Ft. from _____ Line and (East/West) _____ Ft. from _____ Line of quarter section

COUNTY NAME:

DATE	DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
	December 9, 1980	Driller 6110 Log 6112	Oil		
	DRILLING COMPLETED	FORMATION AT T.D.	FT. DRLD. – ROTARY TOOLS	K.B.	R.F.
	January 1, 1981	Gray Niagaran	From 0 To 6112	1098.9	1097.4
	WELL COMPLETED	PRODUCING FORMATION(S)	FT. DRLD. – CABLE TOOLS	R.T.	Grd.
		Niagaran Reef	From _____ To _____		1085.1

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16"	85'	Driven	None
11 3/4	872	450 Sacks	None
8 5/8	3384	250 Sacks	None
5½	6110	475 Sacks	None

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
1-23-81	6	6002, 6003	X	
		6005, 6006		
		6009, 6010		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
Niagaran Reef	Oil	5995	6057

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
None								

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used
1-23-81	6002-3, 6005-6	250 Gallons - 28%
1-24-81	6009-10	750 Gallons - 28%

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
None				

MECHANICAL LOGS, LIST EACH TYPE RUN

Brand	(X)	LOG TYPES	LOGGED INTERVALS
Schlumberger	X	CNL/FDC	200-6110
Birdwell		Dual Later	5700-6110
		Micro Later	5700-6110

DEPTH CORRECTION

DEPTH	CORRECT'N

DEVIATION SURVEY

RUN AT	DEGREES

PLUGGED BACK

YES	NO	DEPTH

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH
227	49	---	370	0		3197/6005

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
February 17, 1981	Linda McConnell Agent ~~D. L. Potter, Consulting Geologist~~	Linda McConnell

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

R - 7210

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
KB-1098.9	Darrell L. Potter	☐ DRILLERS LOG ☒ SAMPLE LOG ☒ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

	TO	FORMATION (TYPE, COLOR, HARDNESS)
0	780	Base of Drift
780	1494	Antrim
1494	1708	Traverse Formation
1708	1784	Traverse Limestone
1784	2348	Bell Shale
2348	2453	Dundee
2453	2508	Reed City Zone
2508	2523	Reed City Anhydrite
2523	2548	Detriot River Formation
2678	3301	Detroit River Salt
3301	3571	Amherstberg
3571	3737	Bois Bland
3737	4142	Bass Island
4142	4432	Salina G-Unit
4432	4467	F-Unit
4467	4500	F-Salt
4500	5104	E-Unit
5104	5223	D-Unit
5223	5251	C-Shale
5251	5336	B-Unit
5336	5354	B-Salt
[redacted]-2	Carbonate	5731
5731	5740	Dolomite, light gray to brown, very finely crystalline, dense, argillaceous
5740	5760	Dolomite, AA, slightly sucrosic
5760	5816	Dolomite, medium to dark brown very finely crystalline, dense argillaceous
A-2	Evaporite	5816
5816	5912	Anhydrite, white to buff, with minor dolomite interbedded
A-1	Carbonate	5912
5912	5995	Dolomite, light to medium brown, dense, very finely crystalline, interbedded with anhydrite (rabbit ears?), white, 3 intervals of anhydrite 5921-29, 5951-58, and 5171-75

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
Niagaran Reef		5995
5995	6057	Dolomite, buff-medium brown finely crystalline, good crystalline porosity, abundant rhombs, good fluorecence, good cut, kicks on gas detecter, mostly C-4
6057	6112	Dolomite, AA, oil/water contact, flourence, and cut decreasing
Total Depth		6112

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

DEC 21 1982

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 34147

FIELD NAME: Mayfield 8

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER: Great Lakes Niagaran, P.O. Box 466, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S): Berry

WELL NUMBER: 1-8

WELL LOCATION: NE ¼ SW ¼ NE ¼ SEC. 8 T. 25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): Oil

TOTAL DEPTH: 6110

FORMATION: Niagaran

DATE PLUGGING STARTED: 12/3/82

DATE PLUGGING COMPLETED: 12/10/82

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Jerry Wendal

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16"	74	-	
11 3/4"	872	-	
8 5/8	3384	2700'	
5 1/2	6110	3450'	

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
Cement	5950	100 sx
Cement	3450	100 sx
Cement	2700	75 sx
Cement	1800	75 sx
Cement	875	100 sx
Cement	surface	10 sx

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO — If yes, give details: See Casing Record Above

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO — If yes, give name and address: Dowell, Kalkaska

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO — If yes, give name and address: T & J Tank, Kalkaska

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: John Vandekerkhof

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED

Set 5 1/2" retainer at 5950'. Spotted 40 sx below and 60 sx on top of retainer. Cut 5 1/2" off at 3450'. Spotted 100 sx at 3450'. Cut and pulled 8 5/8" at 2700'. Spotted 75 sx at 2700'. Spotted 75 sx at 1800'. Spotted 100 sx at 875'. Spotted 10sx on top of 11 3/4" csg.(Surface). Cutt off casing 3' below ground level, and welded on 1/2" steel plate.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"[illegible]e that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direc[illegible] and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Paul D. McConnell, President
McConnell Consulting, Inc.

SIGNATURE: Paul D McConnell

DATE (Month, Day, Year): 12/17/82

COMPANY NAME AND ADDRESS: McConnell Consulting, Inc.
1515 Cass
Traverse City, MI 49684

R 7213

APR 17 1981

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in DUPLICATE Within 30 Days after Well Completion

LANSING HAS ORIGINAL

PERMIT NUMBER: 34419

DEEPENING PERMIT NUMBER:

APR 23 1981

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
Traverse Oil Company
P. O. Box 1053
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Nicor Drilling Rig #21
P. O. Box 36
Gaylord, MI 49735

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT
Weber #3-8

DIRECTIONALLY DRILLED: YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SE NW NE	8	25N	11W	Mayfield

FOOTAGES (North/South) (East/West) — COUNTY NAME: Grand Traverse
854 Ft. from North Line and 1140 Ft. from West Line of quarter section

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME

FOOTAGES (North/South) (East/West) — COUNTY NAME:
____ Ft. from ____ Line and ____ Ft. from ____ Line of quarter section

DATE	DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
	3-18-81	Driller 6283 Log 6273	DRY HOLE		
	DRILLING COMPLETED	FORMATION AT T.D.	FT. DRLD. – ROTARY TOOLS	K.B.	R.F.
	3-30-81	Niagaran	From 0 To T.D.	1108.2'	1106.7'
	WELL COMPLETED	PRODUCING FORMATION(S)	FT. DRLD. – CABLE TOOLS	R.T.	Grd.
	NA	None	From ____ To ____		1093.2'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16"	52'-	DRIVEN	NONE
11 3/4"	866'	585 sx	NONE
8 5/8"	3388'	400 sx	NONE

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

	Brand	(X)	LOG TYPES	LOGGED INTERVALS
	Schlumberger	X	LDT/CNL	200-6270'
	Birdwell		Dipmeter	5650-6272'
OTHER				

DEPTH CORRECTION

DEPTH	CORRECT'N

DEVIATION SURVEY

RUN AT	DEGREES

PLUGGED BACK

YES	NO	DEPTH

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
4-15-81	Rudolph S. Cadena, Drilling Supervisor	Rudolph S. Cadena

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

R - 7210

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1108.2' KB	Christopher B. Keister	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.		
	770	Base of Drift
886	1496	Sunbury
1496	1732	Antrim
1732	1790	Traverse Formation
1790	2344	Traverse Lime
2344	2448	Bell Shale
2448	2516	Dundee
2516	2539	Reed City Anhydrite
2539	2630	Reed City Dolomite
2630	2670	Detroit River Anhydrite
2670	3272	Detroit River Salt
3298	3524	Massive Anhydrite
3524	3735	Amherstburg
3735	4138	Bois Blanc
4138	4429	Bass Islands
4429	4460	Salina G Unit
4460	4496	F Unit
4496	5098	F Salt
5098	5220	E Unit
5220	5232	D Unit
5232	5247	D Salt
[illegible]7	5320	C Shale
[illegible]320	5362	B Unit
5362	5757	B Salt
5757	5872	A2 Carb
5872	6002	A2 Evap
6002	6122	A1 Carb
6122	6151	A1 Evap
6151	6216	Brown Niagaran
6216		Gray Niagaran
6273		Logger's T.D.
6283		Driller's T.D.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

APR 17 1981

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 34419

FIELD NAME:

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Traverse Oil Company, P. O. Box 1053, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S): Weber

WELL NUMBER: #3-8

WELL LOCATION: SE ¼ NW ¼ NE ¼ SEC. 8 T. 25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): DRY HOLE

TOTAL DEPTH: 6283'

FORMATION: Niagaran

DATE PLUGGING STARTED: 3-31-81

DATE PLUGGING COMPLETED: 3-31-81

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: William Booker

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16"	52'	NONE	-
11 3/4"	866'	NONE	-
8 5/8"	3388'	NONE	-

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
CEMENT	6169'	100 sx
CEMENT	4089'	250 sx
	(Kickoff Plug)	

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO
If yes, give details: Casing as listed above

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO
If yes, give name and address: Dowell, Kalkaska, MI 49646

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO
If yes, give name and address: Nicor Drilling, Gaylord, MI 49735

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Rudolph S. Cadena

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED: Went in hole with drill pipe open ended to 6169' and spotted 100 sacks of cement. Pulled up the hole to 4089' and spotted 250 sacks of Hi-dense cement for kickoff plug.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"...te that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direc-..., and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Rudolph S. Cadena, Drilling Supervisor

SIGNATURE: Rudolph S. Cadena

DATE (Month, Day, Year): 4-15-81

COMPANY NAME AND ADDRESS:
Traverse Oil Company
P. O. Box 1053
Traverse City, MI 49684

OPERATORS USE

Description of Detail (cont.) or Other Supplemental Data:

DEPARTMENT USE ONLY

Supplemental Plugging Data and Site Conditions:

~~5/19/81 can recommend approval. Hole redrilled under PN3448? (Booker)~~

FINAL INSPECTIONS BY DEPARTMENT REPRESENTATIVES

SIGNATURE	DIVISION	DATE
William Bowden	Geological Survey	5-20-81

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
APR 17 1981

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in **DUPLICATE** Within 30 Days after Well Completion

LANSING HAS ORIGINAL COPY

PERMIT NUMBER 34489 MAY 01 1981

DEEPENING PERMIT NUMBER

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
Traverse Oil Company
P. O. Box 1053
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Nicor Drilling Rig #21
P. O. Box 36
Gaylord, MI 49735

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT
Weber #3-8A

DIRECTIONALLY DRILLED YES ☒ NO ☐

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SE NW NE	8	25N	11W	Mayfield

FOOTAGES (North/South) 854 Ft. from North Line and (East/West) 1140 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SW NW NE	8	25N	11W	Mayfield

FOOTAGES (North/South) 800 Ft. from North Line and (East/West) 572 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

DATE	DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
	4-1-81	Driller 6320' Log 6323'	DRY HOLE		
	DRILLING COMPLETED	FORMATION AT T.D.	FT. DRLD. – ROTARY TOOLS	K.B.	R.F.
	4-7-81	Niagaran	From 0 To T D	1108.2'	1106.7'.
	WELL COMPLETED	PRODUCING FORMATION(S)	FT. DRLD. – CABLE TOOLS	R.T.	Grd.
	NA	NONE	From ____ To ____		1093.2'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
No additional casing set - see Weber Permit #34419			#3-8-

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

RECEIVED
MAY 20 1981

MECHANICAL LOGS, LIST EACH TYPE RUN — **DEPTH CORRECTION** — **DEVIATION SURVEY** — **PLUGGED BACK**

	Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
	Schlumberger	X	LDT/CNL/GR	3700-6321							
	Birdwell		Dipmeter	5764-6312							
OTHER											

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
4-15-81	Rudolph S. Cadena, Drilling Supervisor	Rudolph S Cadena

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1108.2' KB	Christopher B. Keister	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)	FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.					
3736'	MD	Bois Blanc	3735.8'	TVD	
4142'	MD	Bass Island	4137.2'	TVD	
4442'	MD	Salina G Unit	4430.1'	TVD	
4476'	MD	F Unit	4463.3'	TVD	
4510'	MD	F Salt	4496.5'	TVD	
5126'	MD	E Unit	5095.3'	TVD	
5249'	MD	D Unit	5214.3'	TVD	
5264'	MD	D Salt	5228.8'	TVD	
5278	MD	C Shale	5242.3'	TVD	
5355'	MD	B Unit	5317.0'	TVD	
5397'	MD	B Salt	5357.9'	TVD	
5794'	MD	A2 Carb	5748.7'	TVD	
5910'	MD	A2 Evap	5862.9'	TVD	
6032'	MD	A1 Carb	5982.8'	TVD	
6148'	MD	A1 Evap	6096.7'	TVD	
6184'	MD	Brown Niagaran	6132.0'	TVD	
6266'	MD	Gray Niagaran	6212.5'	TVD	
6230'	MD	Driller's T.D.	6265'	TVD	
6323'	MD	Logger's T.D.	6268.5'	TVD	

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

APR 17 1981

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER 34489 APR 23 1981

FIELD NAME

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Traverse Oil Company, P. O. Box 1053, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S)	WELL NUMBER
Weber	#3-8A

WELL LOCATION	TOWNSHIP	COUNTY
SE ¼ NW ¼ NE ¼ SEC. 8 T. 25N R. 11W	Mayfield	Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.)	TOTAL DEPTH	FORMATION
DRY HOLE	6320'	Niagaran

DATE PLUGGING STARTED	DATE PLUGGING COMPLETED	DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING
4-8-81	4-8-81	William Booker

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
No additional casing set - see Permit #34419			Weber #3-8

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
CEMENT	6293'	125 sx
CEMENT	4030' (Kickoff Plug)	250 sx

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO
If yes, give details: 16" from 0 to 52'; 11 3/4" from 0 to 866' 8 5/8" from 0 to 3388'

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO
If yes, give name and address: Dowell Kalkaska, Michigan

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO
If yes, give name and address: Nicor Drilling Gaylord, Michigan 49735

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Rudolph S. Cadena

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED: Went in hole with drill pipe open ended to 6293' and spotted 125 sacks of Class A cement. Pulled up the hole to 4030' and spotted 250 sacks of Hi-dense cement for kickoff plug.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

I certify that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction, and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed)	SIGNATURE	DATE (Month, Day, Year)	COMPANY NAME AND ADDRESS
Rudolph S. Cadena, Drilling Supervisor	Rudolph S. Cadena	4-15-81	Traverse Oil Company P. O. Box 1053 Traverse City, MI 49684

OPERATORS USE

Description of Detail (cont.) or Other Supplemental Data:

DEPARTMENT USE ONLY

Supplemental Plugging Data and Site Conditions:

~~5/19/81 can recommend approval. Hole redrilled under PN35006.~~
~~(Booker)~~

FINAL INSPECTIONS BY DEPARTMENT REPRESENTATIVES

SIGNATURE	DIVISION	DATE
William Booker	Geological Survey	5-20-81

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

NOV 3 1981

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in **DUPLICATE** Within 30 Days after Well Completion

LANSING HAS ORIGINAL

PERMIT NUMBER: 34506

DEEPENING PERMIT NUMBER:

DEC 01 1981

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT:
Traverse Oil Company
P. O. Box 1053
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S):
Nicor Drilling Company
P. O. Box 36
Gaylord, MI 49735
Rig #21

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT: Weber #3-8B

DIRECTIONALLY DRILLED: YES [X] NO [ ]

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SE NW NE	8	25N	11W	Mayfield

FOOTAGES: 854 Ft. from North Line and 1140 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SE NE NE	8	25N	11W	Mayfield

FOOTAGES: 820 Ft. from North Line and 903 Ft. from East Line of quarter section — COUNTY NAME: Grand Traverse

DATE				ELEVATIONS	
DRILLING BEGUN: 4-09-81	TOTAL DEPTH OF WELL: Driller 6154' Log 6138'	TYPE WELL: NEGATIVE COMPLETION			
DRILLING COMPLETED: 4-16-81	FORMATION AT T.D.: Niagaran	FT. DRLD. – ROTARY TOOLS: From 0 To T.D.		K.B. 1108.2'	R.F. 1106.7'
WELL COMPLETED	PRODUCING FORMATION(S): None	FT. DRLD. – CABLE TOOLS: From ____ To ____		R.T.	Grd. 1093.2'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
5 1/2"	6154'	350 sx	4418'

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
5/28	11	5956-5966'	X	

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used
5/29	5956-66'	1250 gals. 28% HCL

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

DEPTH CORRECTION — DEVIATION SURVEY — PLUGGED BACK

Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
Schlumberger	X	CNL/FDC	3370-6135'		SEE ATTACHED	SURVEY	REPORT			
Birdwell		DLL/Micro	5750-6130'							
OTHER										

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
11-2-81	Christopher B. Kesiter, Geologist	Christopher B. Kesiter

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

R - 7210

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1108.2' KB	Daniel J. Hendrix	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)	FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
3546'MD	3734'	Amherstburg	3545.8' TVD		
3734'	4146'	Bois Blanc	3733.8' TVD		
4146'	4446'	Bass Island	4141.1' TVD		
4446'	4479'	Salina G Unit	4434.2' TVD		
4479'	4512'	F Unit	4466.6' TVD		
4512'	5134'	F Salt	4498.9' TVD		
5134'	5264'	E Unit	5103.5' TVD		
5264'	5277'	D Unit	5228.6' TVD		
5277'	5292'	D Salt	5241.1' TVD		
5292'	5370'	C Shale	5255.5' TVD		
5370'	5410'	B Unit	5330.6' TVD		
5410'	5783'	B Salt	5369.2' TVD		
5783'	5871'	A2 Carbonate	5719.2' TVD		
5871'	5934'	A2 Evaporite	5800.4' TVD		
5934'	5964'	A1 Carbonate	5858.5' TVD		
5964'		Niagaran Reef	5886.2' TVD		
6134'		Logger's Total Depth	6042.7' TVD		
6154'		Driller's Total Depth	6061.1' TVD		

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

NOV 3 1981

LANSING HAS COPY

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER 34506 '9 1981

FIELD NAME

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Traverse Oil Company, P. O. Box 1053, Traverse City, Michigan 49684

COMPLETE LEASE OR FARM NAME(S) Weber

WELL NUMBER #3-8B

WELL LOCATION SE ¼ NW ¼ NE ¼ SEC. 8 T. 25N R. 11W

TOWNSHIP Mayfield

COUNTY Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.) NEGATIVE COMPLETION - DRY HOLE

TOTAL DEPTH 6154'

FORMATION Niagaran

DATE PLUGGING STARTED 9-2-81

DATE PLUGGING COMPLETED 9-4-81

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING Jerome F. Wendel

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
5 1/2"	6154'	4418'	CUT

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
CEMENT RETAINER	5840'	50 sx under & 30 sx on top
CEMENT-KICKOFF PLUG	4012-3550'	165 sacks

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [XX] YES [ ] NO
If yes, give details: 16" from 0 to 52', 11 3/4" from 0 to 866', 8 5/8" from 0 to 3388', 5½" from 4418' to 6154'

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO
If yes, give name and address: McCullough, Kalkaska, Michigan

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO
If yes, give name and address: Reef Petroleum, Traverse City, MI 49684

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Larry Anderson

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED Tripped in hole with 5½" EZSV retainer and set at 5840'. Filled and circulated hole. Put 50 sacks of cement under retainer and 30 sacks of cement on top. Pulled 6 stands and reverse circulated. Stood back 76 stands and laid down 40 joints. Rigged down BOPs and tubing spool. Welded slips to casing. Pulled slips out. Freepoint 5½" casing - free at 4418'. Cut 5½" casing at 4418'. Pulled 5½" casing - 99 joints + 1 - 25' cut off. Bottom at 4012'. Circulated hole with fresh water. Mixed 165 sacks of cement 4012' to 3550' for kickoff plug. Pulled 12 stands. Reverse circulated. Laid down tubing.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"I state that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed) Christopher B. Keister, Geologist

SIGNATURE Christopher B. Keister

DATE (Month, Day, Year) 11-2-81

COMPANY NAME AND ADDRESS
Traverse Oil Company
P. O. Box 1053
Traverse City, MI 49684

R 7213

OPERATORS USE

Description of Detail (cont.) or Other Supplemental Data:

DEPARTMENT USE ONLY

Supplemental Plugging Data and Site Conditions:

12/1/81 All records in. Hole directionally drilled under PN34968 Weber 3-8"C". OK for GS approval. (Snider)

FINAL INSPECTIONS BY DEPARTMENT REPRESENTATIVES

SIGNATURE	DIVISION	DATE
John R. Snider	Geology	12/1/81

PERFORATIONS AND TREATMENT

DATE	HOLES	DEPTH	ACID	REMARKS

	CUT	REC.
CORE 1		
CORE 2		
CORE 3		
CORE 4		
CORE 5		
CORE 6		
CORE 7		
CORE 8		

DST 1

IHMP FSIP

ISIP FHMP

IFP

FFP

DST 2

IHMP FSIP

ISIP FHMP

IFP

FFP

DST 3

IHMP FSIP

ISIP FHMP

IFP

FFP

9/10/81 Plan to KO at 3700' w/dyna drill. Plan to put w/ dyna drill. Plan to KO at 3700' w/dyna drill. Plan to put away reserve pit fl down the 113/4" 8/58" annulus. Will spud this PM Dir S85°W (JFW) 9/14/81 last survey: 5589' md 7.75° angle dir S11°W, vert sect 218.61 TVD 5577.94 coords S92.90, W198.5 Keeping pits pumped off down the annl below torn lnr. Pre May 1st guidelines on pit lnr (JFW) 9/16/81 mud 10.8 vis 29 w/l 18 chls 200,000 PPM. Last survey MD 5808, TVD 5793 vert sec 259.0, dir S12½°W Coords 5103.0 and 238' W (JFW) 9/17/81 ran full str 5½" csg to 6149 (MD) cmtd w/100 sx fill up & 200 sx tail slurry (Dowell) drld compld 11 am 9/16 putting away drlg. fluids down the annulus Rig to move to Berry 2-14 A (CLEON, MANISTEE) (JFW) 10/14/81 pits have been pumped off and filled in Leveling loc prior to setting prod equip Will go on pump immediately (JFW)

CORRECTIONS

R7304 R/73

Date PI A[illegible] Permit No. 34968
Co. Mosbacher Prod.Co.
Lease Weber No. 3-8C
Twp. Mayfield Co. Gr.Trav.
Loc. SE NW NE Sec. 8 T. 25 R. 11
___ from ___ and ___ from ___ line of ¼ Sec.
___ from ___ and ___ from ___ unit line
Contractor Will Notify
Comm. 9/17/81 Comp.
SEC. 8

PLUGGING SUMMARY

Bridges/Plugs	Casing Pulled
Got app plug date 6/4/86	
old for app 7/9/86	

HOLE Dia.	Depth	CASING Dia.	Wt.	Depth	CEMENT Sacks	TOC
16"		52'	driven,existing			
11 3/4"		866	circul. "			
8 5/8"		3380	300SX		TOC	2910
KOP	@	3800			perfs:	6066-80
5Y2	@	6149				

KB 1109.8'
RIH w/ 51/2" cmt. ret.to 6000' & squezze off perfs. w/50 sx thru & 50 sx on top. FP, cut & pull 5 1/2" csg. Rerun DP to 3450' & spot 100 sx below 8 5/8" csg. shoe. FP,cut & pull 8 5/8" csg. Run DP to 2600' & spot 75sx below Dd top. Pull DP to 1700 & spot 75sx @ Tl top. Pull DP to 900 & spot 75sx below sur. csg. shoe. Place 15sx @ the top. Cut off csg. 3' below gr. level & weld on a 1/2" steel plate.

Date PI 9/3/81 Permit No. 35006
Co. Trav Oil Co.
Lease Weber No. 3-8"B"
Twp. Mayfield Co. Grand Trav.
Loc. SE NW NE, Sec. 8 25N R. 11W
___ from ___ and ___ from ___ line of ¼ Sec.
___ from ___ and ___ from ___ unit line
Contractor Dowell Tally Compl Rig
Comm. plug 9/3/81 Comp.
SEC. 8

PLUGGING SUMMARY

Bridges/Plugs	Casing Pulled

HOLE Dia.	Depth	CASING Dia.	Wt.	Depth	CEMENT Sacks	TOC
16"	52					
5½"	6154					

Lower perfs: 5993-95-97-99-6001-05-07
7 holes in 14' 5956-66 (1 JSPF or 11 holes

RIH w/5½" cmt ret to 5850 Squeeze 50 sx thru & spot 35 sx on top. Freept and pull 5½" csg. Spot 200 sx HiDense KOP at 4000'. Calculated TOC 3475'. KOP at 3700' in the BI.

MOSBACHER ~~TRAV~~ CO. [illegible]NERGY

Date 9/3/81 Permit No. 34968
Co. ~~Traverse Oil Co.~~ ~~REEF PET.~~
Lease Weber No. 3-8"C"
Twp. Mayfield Co. Grand Trav.
Loc. SE NW NE, Sec. 8 T. 25N R. 11W
854 from N and 1140 from W line of ¼ Sec.
884 from N and 808 from W unit line
Contractor Reef Drlg.
Comm. Comp.
SEC. 8

PLUGGING SUMMARY

Bridges/Plugs	Casing Pulled
N/ Allowable	
Cut plugs 6/4/86	
B/D	770

HOLE Dia.	Depth	CASING Dia.	Wt.	Depth	CEMENT Sacks	TOC
16	52					
11 3/4	866					
8 5/8	@ 3380					TOC 2910

16" 60# condr existing; 11 3/4" 42# H40 new exiting; 8 5/8" 32# K55 existing; 5½" 15.5# K55 6450' w/300 sx;
SAME SURF AS PN 34419, 34489, 34506

Ran 5 1/2" to 6149 on 9/17/81

Frac on 3/25/82

Transferred to Reef Pet. Corp 7/16/82

Depth	Log		Form	Depth	Log	Datum
		E LOG	TOPS			
			BB			
		3754	BI			
		4133MD4130TVD	Sal			
		4440	F	4436		
		4510	E	4505		
		5107	D	5099		
		5227	C	5219		
		5242	BEv.	5234		
		5257	A2C	5248		
		5325	A2Ev	5315		
		5358	Alc	5348		
		5748	Pay	5737		
		5764	BN	5752		
		5878	Pay	5861		
		5993	GN	5973		
		6049	Cl	6028		
			Cinn			
		6149	U	6126		
			Trent			
			Pay			
			BRF			
			Gw			
			SP.			
			Pdc			
			Camb			
			PE			
			TD			
			PBTD			
			I.P.			

g Permit	CORES. D.S.T.'s. Shows. L.C.Z.'s.
g Comm	
g Comp.	
g Record	
Recl'm	
App'l.	

17

P/N 34968

Form	Depth	Log	Datum	Form	Depth	Log	Datum
Drift	TRAV OIL ATTEMP			BB			
	TO COMPL UPPER			BI			
	ZONE W/NEG			Sal			
TG	RESULTS (6/30)			F			
BL	REEF PET CORP			E			
Stray	WORKING FOR TRV			D			
Pay	OIL ATTEMPTED			C			
Wtr	TO COMPL LOWER			BEv.	ZONE		
Marsh	W/NEG RESULTS			A2C			
Wtr	(9/1/81)			A2Ev			
Cwrr				Alc			
Sun				Pay			
Ber				A-1 Ev			
Pay				BN			
Wtr				Pay			
Ant				GN			
TF				Cl			
TL				Cinn			
Pay				U			
Wtr				Trent			
Dd				Pay			
Pay				BRF			
Wtr				Gw			
RCA				SP.			
RCD				Pdc			
DR				Camb			
M.S.							
S.Z.							
M.A.				PE			
Rich.				TD			
				PBTD			
Sylv.				I.P.			

Plug'g Permit	CORES. D.S.T.'s. Shows. L.C.Z.'s.
Plug'g Comm.	
Plug'g Comp.	
Plug'g Record	
Site Recl'm	
Site App'l.	

R-7217

P/N 35006

Form	Depth	Log	Datum	Form	Depth	Log	Datum
Drift				B.B.			
				BI			
				Sal			
TG				F			
BL				E			
Stray				D			
Pay				C			
Wtr				BEv.			
Marsh				A2C			
Wtr				A2Ev			
Cwrr				Alc			
Sun				Pay			
Ber				A-1 Ev			
Pay				BN			
Wtr				Pay			
Ant				GN			
TF				Cl			
TL				Cinn			
Pay				U			
Wtr				Trent			
Dd				Pay			
Pay				BRF			
Wtr				Gw			
RCA				SP.			
RCD				Pdc			
DR				Camb			
M.S.							
S.Z.							
M.A.				PE			
Rich.				TD			
				PBTD			
Sylv.				I.P.			

Plug'g Permit	CORES. D.S.T.'s. Shows. L.C.Z.'s.
Plug'g Comm.	
Plug'g Comp.	
Plug'g Record	
Site Recl'm	
Site App'l.	

R-7217

P/N 34968

☐ FIELD
☑ EXPLORATORY MAYFIELD - [illegible]
☐ FACILITY
☐ OTHER

PERMIT 34968
D.P.
RECORDS DUE:

OPERATOR: Traverse Oil Co.
FARM: Weber 3-8"C"
COUNTY Grand Trav.TWP. Mayfield
LOCATION SE NW NE, S8 T25 R11
NL SL EL WL

CASING RECORD

SIZE	AMOUNT	CEMENT
16"	52	
11¾	586	500
10		
8⅝	3055	300
7		
6		
5½"	6149	300
Liner		

ELEVATIONS

RIG FLOOR	
K.B.	1109.8
R.T.Platf.	1108.3
GROUND	1094.3
DRLG. COMM.	9/10/81
DRLG. COMP.	9/17/81
WELL COMP.	11/11/82
DEEP. COMM.	
DEEP. COMP.	
LOST CIRC. ZONES	

CONTRACTOR
Reef Drlg.

ROTARY ☒
CABLE ☐
COMB. ☐

FREEDOM #1

9/10/81 KOP at 3550' to 4012 will spud PM
KOP 3700
9/14 Ø 7 7/8" hole at 5589 in B Sal-t
9/16 RTD 7/8" hole at 6049 (MD) in BNia
Iss tent. PI prior to log by Schlumb WOO
9/17/81

POROSITY

STRAY	
MARSH	
BE.	
TL	
DD	
RCD	
DR	
SZ	
RICH.	
E	
A_1	
NIAG.	
TRENT	
BRF	
VW	

WELL COMPLETED AS: OIL ☑ GAS ☐
PRODUCING FORMATION N/A
GRAVITY API

(N) IP
(A) IP 140 BOPD & 100 MCFPD GAS
CHOKE TP CP

FORM.	DEPTH	LOG	DATUM
DRIFT	MD/TVD		
TG	BOD		
BL			
STRAY			
MARSH			
CRR			
SUN			
BE			
ANT			
TF			
TL	BB 3698/3697.6		
ALP	BI 4130. 4126.9		
BELL	SAL 4434. 4429		
DD	EU 4465 4459.8		
RCA	FS 4498 4492.7		
RCD	EU 5106 5097.6		
DR	DU 5228. 5218.9		
SYLV	DS 5242 5332.8		
BB	CSH 5254 5244.7		
BI	BU 5328 5318.8		
SAL	BS 5370 5318.8		
E	A2C 5760 5360		
D	A2E 5860 5843.4		
C	A1C 5968 5949		
B EVAP	B Nia 6054 6033		
A_2CARB	GR 6148 6123.9		
A_2EVAP	DTD 6149 MD		
A_1CARB	6125.9 TVD		
A_1EVAP	LTD 6144 MD		
B NIAG			
W NIAG			
CL			
CINN			
TRENT			
BRF			
GW			
SP			
PDC			
CAMB			
PREC			
PBTD			
T.D.			

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

PERMIT NUMBER: 34968

FIELD NAME: Mayfield 8

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Mosbacher Energy Company, 712 Main, Suite 2200, Houston, TX. 77002-3290

COMPLETE LEASE OR FARM NAME(S)
Weber

WELL NUMBER: 3-8C

WELL LOCATION
SE ¼ NW ¼ NE ¼ SEC. 8 T. 25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Gr. Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.)
Dry Hole

TOTAL DEPTH: 6149'

FORMATION: Niagran

DATE PLUGGING STARTED: 6/9/86

DATE PLUGGING COMPLETED: 6/13/86

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Jerome F. Wendel

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16	52'	--	--
11-3/4	866'	--	--
8-5/8	3380'	2789'	2789'
KOP @	3800	--	--
5-1/2	6149	4400	4400

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
Cement Retainer	6000	50 sxs
Cement plug	3450	100 sxs
Cement plug	2600	75 sxs
Cement plug	1700	75 sxs
Cement plug	900	75 sxs
Cement plug	60	15 sxs

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? ☐ YES ☒ NO — If yes, give details:

Was a Service Company pump mud, spot cement, or set bridge plugs? ☒ YES ☐ NO — If yes, give name and address: Welltech Rig #159, 2284 Enterprise Dr. Mt. Pleasant, MI. 48858

Was the well plugged by a Company or Contractor other than Owner or Operator? ☐ YES ☒ NO — If yes, give name and address:

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: Don Hester

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED
(SEE ATTACHED)

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"I [illegible]te that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direc[illegible] and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Frances Tepera, Engineering Asst.

SIGNATURE: Frances Tepera

DATE (Month, Day, Year): 6/17/86

COMPANY NAME AND ADDRESS:
Mosbacher Energy Company
712 Main, Suite 2200
Houston, TX 77002-3290

OPERATORS USE

Description of Detail (cont.) or Other Supplemental Data:

DEPARTMENT USE ONLY

Supplemental Plugging Data and Site Conditions:

Loc. levelled & contoured. Slopes in gravel pit re-shaped. All equip removed from loc.

FINAL INSPECTIONS BY DEPARTMENT REPRESENTATIVES		
SIGNATURE	DIVISION	DATE
Jerome F Wendell	Geol. Survey	7/16/86

OPERATIONS IN SEQUENCE:

600 psi SICP. Blew well dead. Pumped 142 bbl 10# brine in casing.
Well on vacuum.

Welded 2" nipple in 5-1/2" casing, pulling nipple.

Moved in tubing string.

OPERATIONS IN SEQUENCE:

MIRU Welltech Rig #159.

Tried changing out rams in BOP's. (2 hr rig time)

Installed BOP's, ran in hole w/tubing, picked up off ground 4374' of 2-3/8" & 1626' of 2-7/8".

Set cement retainer @ 6000'.

Had trouble getting rabbit to go thru tubing, (7 hr going in hole).
Stung out of retainer.

Circ fresh water around tubing. 133 bbl used.
Stung back in and ran injection test-6 BPM @ 100 psi,

Hydraulic pump went out on rig.
SION @ 9:30 pm.

OPERATIONS IN SEQUENCE:

Repaired hydraulic pump on rig.

Squeezed 50 sx common cement in perf's.
FPP 1600 psi.

Spotted 50 sx on top of retainer.

TOH w/tubing.

Tried to pull 5-1/2" casing, worked on rig clutch 3½ hr.
Clutch finally repaired, able to pull slips on 5½" casing.

RU Sego.

Free point and shot off 5½" @ 4400'. Pulled 16 jts 5½" casing.

Welltech casing tongs were mashing casing.
SION @ 8:30 pm.

OPERATIONS IN SEQUENCE:

RU Casing crew.

TOH w/5½" casing. Total of 114 joints (4441').
TIH w/tubing to 3450'. Spot 100 sx.

TOH w/tubing. Free point and cement 8" casing @ 2800'.
SION.

OPERATIONS IN SEQUENCE:

RU Niagaran. Lay down 69 joints 8-5/8" casing. (Total 2789').

TIH w/tbg to 2600'. Spot 75 sx cement.
COOH, ly down tbg.
Spot 75 sx @ 1700', 75 sx @ 900' & 15 sx @ 60'.

RD MO service rig.
Welded plate on 11-3/4" below ground. Cut and capped all flow lines
Below ground.

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)

Submit in **DUPLICATE** Within 30 Days after Well Completion

PERMIT NUMBER 34594

DEEPENING PERMIT NUMBER

FEB 03 1983

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT
Great Lakes Niagaran
P.O. Box 466
Traverse City, MI 49684

NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Nicor Drilling Company
Gaylord, MI 49735

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT
Berry #2-8

DIRECTIONALLY DRILLED YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NE/4 SW/4 NE/4	8	25N	11W	Mayfield

FOOTAGES 854 Ft. from South (North/South) Line and 825 Ft. from West (East/West) Line of quarter section

COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
same				

FOOTAGES _____ Ft. from _____ (North/South) Line and _____ Ft. from _____ (East/West) Line of quarter section

COUNTY NAME:

DATE				
DRILLING BEGUN 5/16/81	TOTAL DEPTH OF WELL Driller 6225 Log 6211	TYPE WELL Oil	ELEVATIONS	
DRILLING COMPLETED 5/25/81	FORMATION AT T.D. Niagaran	FT. DRLD. – ROTARY TOOLS From – To 6211	K.B. 1104.3	R.F.
WELL COMPLETED 12/21/81	PRODUCING FORMATION(S) Niagaran	FT. DRLD. – CABLE TOOLS From _____ To _____	R.T.	Grd. 1088.9

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16"	90	Driven	
11 3/4"	890	300 sx	
8 5/8"	3362	300 sx	
5 1/2"	6210	250 sx	4500

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
6/15/81	12	6000-6006		
12/15/81	7	6021-6024		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
Niagaran	Oil	6000	6024

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
–								

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used
6/15/81	6000-6006	500 gals 28% acid
6/30/81	"	4000 gals 15% HCL Acid
"	"	3000 gals 15% HCL Gelled
12/15/81	6021-6024	500 gals 28% Acid

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT

MECHANICAL LOGS, LIST EACH TYPE RUN

DEPTH CORRECTION

DEVIATION SURVEY

PLUGGED BACK

Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
Schlumberger	X	CNL/LDT	200-6211							
Birdwell		DLL/MLL	5700-6205							
OTHER										

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH
20	46	–	–	100	nil	–

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
2/1/83	Linda McConnell Agent	Linda McConnell

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
KB: 1104.3	McConnell	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
0	780	Drift - sandstone
780	1502	Base of Drift - sandstone
1502	1712	Antrim - Shale
1712	1787	Traverse Fmt - ls, lt gy
1787	2352	Traverse Lime - ls, lt to m/brn
2352	2455	Bell Shale- sh, dk gy
2455	2640	Dundee - ls, m/brn
2640	3212	Detroit River Salt - salt
3212	3612	Base Det River Salt - Anhy
3612	3740	Amherstburg -ls, dk brn
3740	4139	Bois Blanc -chert
4139	4437	Bass Islands - dol, m/brn
4437	4468	G Unit-sh , lt gy
4468	4500	F Unit-dol, lt brn tan
4500	5106	F Salt -slat
5106	5226	E Unit - Dol, m/brn
5226	5256	D Unit - salt
5256	5328	C Shale-shale
5328	5356	B Unit - dol, lt brn
5356	5746	B Salt - See Mud Log
5746	5832	A2 Carb
58[illegible]	5952	A2 Evap
59[illegible]	6000	A1 Carb
6000		Reef

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION

WELL PLUGGING RECORD

(Submit in TRIPLICATE Within 30 Days After Plugging is Completed)

FEB 03 1993

PERMIT NUMBER: 34594

FIELD NAME:

COMPLETE NAME(S) AND ADDRESS OF WELL OWNER
Great Lakes Niagaran, P.O. Box 466, Traverse City, MI 49684

COMPLETE LEASE OR FARM NAME(S): Berry 2-8

WELL NUMBER: 2-8

WELL LOCATION: NE ¼ SW ¼ NE ¼ SEC. 8 T.25N R. 11W

TOWNSHIP: Mayfield

COUNTY: Grand Traverse

TYPE OF WELL (Oil, Gas, Dry Hole, etc.): Oil

TOTAL DEPTH: 6210

FORMATION: Niagaran

DATE PLUGGING STARTED: 1/4/83

DATE PLUGGING COMPLETED: 1/11/83

DEPT. REPRESENTATIVE(S) WHO ISSUED PERMIT OR WITNESSED PLUGGING: Jerry Wendel

CASING RECORD

SIZE CASING	DEPTH SET	AMOUNT RECOVERED	SHOT OR RIPPED
16"	90	Driven	
11 3/4"	890		
8 5/8	3362		
5 1/2	6210	4500'	

BRIDGES OR PLUGS

TYPE (Brush, Stone, Cement, Mechanical, etc.)	DEPTH PLACED	SACKS OF CEMENT AND ADDITIVES
Cement	5950	50 sx
"	4500	100 sx

Were tools, tubing, casing, etc., lost or left in the hole before or during plugging? [X] YES [ ] NO

If yes, give details: See Casing Record

Did a Service Company pump mud, spot cement, or set bridge plugs? [X] YES [ ] NO

If yes, give name and address: Dowell, Kalkaska, MI

Was the well plugged by a Company or Contractor other than Owner or Operator? [X] YES [ ] NO

If yes, give name and address: T & J Tank #1, Kalkaska, MI

Representatives of Owner, Operator, Company, or Contractor who witnessed plugging: John Vandekerkhof

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED

Set Retainer at 5950. Perfs Would not take cement. Dumped 50 sx on top of retainer at 5950. Feepointed, cut & pulled 5 1/2" casing at 4500'. Spotted 100 sx High dense cement as Kickoff plug.

(USE REVERSE SIDE IF NEEDED)

CERTIFICATION

"I certify that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision and direction and that the facts stated herein are true, correct and complete to the best of my knowledge."

NAME AND TITLE (Typed or Printed): Linda McConnell, Sec/Treas
McConnell Consulting, Inc.

SIGNATURE: Linda McConnell

DATE (Month, Day, Year): 2/2/83

COMPANY NAME AND ADDRESS:
McConnell Consulting, Inc.
1515 Cass
Traverse City, MI 49684

R 7213

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES

LOG OF OIL, GAS, DISPOSAL STORAGE WELL (ACT 61)

Submit in DUPLICATE Within 30 Days after Well Completion

PERMIT NUMBER 26359 — Page C-43

DEEPENING PERMIT NUMBER — JUN 09 1983

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT	NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Great Lakes Niagaran P.O. Box 466 Traverse City, MI 49684	McLachlan Drilling Company Evart, MI 49631

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT: Berry 2-8A

DIRECTIONALLY DRILLED: YES [X] NO [ ]

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NE¼ SW¼ NE¼	8	T25N	R11W	Mayfield

FOOTAGES (North/South) 854 Ft. from South Line and (East/West) 825 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
NE¼ SW¼ NE¼	8	T25N	R11W	Mayfield

FOOTAGES (North/South) 984 Ft. from South Line and (East/West) 760 Ft. from West Line of quarter section — COUNTY NAME: Grand Traverse

DATE				ELEVATIONS	
DRILLING BEGUN	1-17-83	TOTAL DEPTH OF WELL Driller 6065 Log 6063	TYPE WELL: Oil		
DRILLING COMPLETED	1-25-83	FORMATION AT T.D.: Niagaran	FT. DRLD. – ROTARY TOOLS From ____ To ____	K.B. 1103.3	R.F.
WELL COMPLETED	5-8-83	PRODUCING FORMATION(S): Niagaran	FT. DRLD. – CABLE TOOLS From ____ To ____	R.T.	Grd. 1088.9

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
16"	90	Driven	
11 3/4"	890	300 sx	
8 5/8"	3362	300 sx	
5 1/2"	6064	150 sx	

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
2-5-83	18	5880-5977		
4-2-83	4	6022-6025		

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
A1Carb	Oil	5880	5910
Niagaran	Oil	5940	5978

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
None								

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used
2-6-83	5880-5977	3600 gals 28% acid
2-16-83	5880-5977	5000 gals 28% acid
2-24-83	5966-5977	15,000 gals 28% acid
2-25-83	5880-5910	2000 gals 28% acid
4-6-83	6022-6025	1000 gals 20% acid
4-8-83	5880-5910	12,000 gals 20% acid (Frac job)
5-6-83	6022-6025	18,000 gals 20% acid (Frac job)

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
None				

MECHANICAL LOGS, LIST EACH TYPE RUN

Brand	(X)	LOG TYPES	LOGGED INTERVALS
Schlumberger	X	LDT/CNL	4000-6060
Birdwell		DLL/MLL	4000-6060
OTHER			

DEPTH CORRECTION

DEPTH	CORRECTN

DEVIATION SURVEY

RUN AT	DEGREES
See attached	

PLUGGED BACK

YES	NO	DEPTH

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH
30	46	0	--	100	Nil	1921 psi 5929

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
5-26-83	Linda McConnell	Linda McConnell

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

R - 7210
Rev. 3/77

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
BOX 30028
LANSING, MICHIGAN 48909

APPROPRIATE BLOCKS. FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS.
REQUIRED BY AUTHORITY OF:
[X] ACT 61, P.A. 1939, AS AMENDED [ ] ACT 315, P.A. 1969, AS AMENDED
NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT.

RECORD OF WELL: [X] PLUGGING [ ] REWORK
(MAIL THREE COPIES TO THE DISTRICT OFFICE WITHIN 30 DAYS AFTER COMPLETION OF PLUGGING OR REWORK)

PERMIT NO.	TYPE OF WELL
36359	Dry hole
FIELD/FACILITY NAME	
Wildcat	
WELL NAME & NUMBER	
Berry et al #2-8A	
WELL LOCATION	
NE ¼ of SW ¼ of NE ¼ Section 8 T25N R 11W	
TOWNSHIP	COUNTY
Mayfield	Grand Traverse
TOTAL DEPTH	FORMATION
6064'	Niagaran
PLUGGING/REWORK STARTING DATE	PLUGGING/REWORK COMPLETION DATE
2/3/86	2/6/86
TOTAL DEPTH AFTER REWORK	MECHANICAL LOGS RUN
surf.	
WELL COMPLETED FOR	FORMATION AND ZONE

NAME AND ADDRESS OF WELL OWNER
Great Lakes Niagaran
c/o Louis A. Smith
603 Bay Street
Traverse City, MI 49684

CASING SIZE	WHERE SET	AMOUNT RECOVERED	SHOT OR RIPPED	TYPE OF BRIDGES OR PLUGS	DEPTH PLACED	SACKS OF CEMENT & ADDITIVE
16"	80	none		cement	30'	15 sx Cl A
113/4"	893	"		"	950'	75 sx Cl A
85/8"	3562	2500	shot	"	1800'	75 sx Cl A
5½"	6064	4380	"	"	2500'	75 sx Cl A
				"	3400	100 sx Cl A
				Cement & retnr.	5800'	50/50 sx Cl A

WERE TOOLS, TUBING, CASING, ETC. LOST OR LEFT IN THE HOLE BEFORE OR AFTER PLUGGING? IF YES, GIVE DETAILS.
yes - see above

DID A SERVICE COMPANY PUMP MUD, SPOT CEMENT, OR SET BRIDGE PLUGS? IF YES, GIVE NAME AND ADDRESS.
Yes: Dowell
Kalkaska, MI

WELL PLUGGING/REWORK CONTRACTOR AND ADDRESS
Niagaran Well Services
Traverse City, MI 49684

PERMITEE'S PLUGGING WITNESS
JACK ROKOS

NAME(S) OF DNR REPRESENTATIVE WHO:
Jerry Wendel
[X] ISSUED PERMIT
[ ] WITNESSED PLUGGING

WELL CASING RECORD — BEFORE REWORK

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?
16"	80	drvn	n/a				
113/4"	893	n/a	n/a				
85/8"	3362	n/a	n/a				
5½"	6064	n/a	n/a	5880	5977		

WELL CASING RECORD — AFTER REWORK (Indicate additions and changes only)

Casing Size	Casing Depth	Cement Sacks	Cement Type	Perforations From	Perforations To	Acid or Fracture Treatment Record	Perforations If plugged, how?

DESCRIBE IN DETAIL HOW WELL WAS PLUGGED OR REWORKED.
Set 5½" cmt. retnr. at 5800'. Spot 50 sx Cl A cmt. below and 50 sx Cl A on top of retnr. TOOH. Freept. & cut 5½" csg. off at 4380', LD same. TIH w/tubg. to 3400'. Spot 100 sx Cl A cmt. at 3400'. TOOH w/tubg. Freept. and cut 85/8" csg. off at 2500'. LD same. TIH w/tubg. to 1800'. Spot 75 sx Cl A cmt. LD tubg. to 950;. Spot 75 sx cl A at 950'. LD tubg. to 30'. Spot 15 sx Cl A cmt. Cut wellhead off 4' below grd. level and cap w/1/2" steel plate.

...JECTION TEST RECORD

Date	Oil (Bbls.)	Water (Bbls.)	Gas (MCF)	Pressure	
				Tubing	Casing

DAILY INJECTION TEST RECORD: ☐ INJECTION W.
☐ BRINE

Date	Bbls. Water or MCF Gas	Pressure		Specific G. of Water
		Beginning	Ending	

)LUTION MINING FRACTURING RECORD: Pressure, Rate, Volume, and Name of Receiving Unit (Act 315, P.A. 1969, as amended)

AL TESTING AFTER REWORK (Disposal: Injection Rate and Pressure)
(Brine: Original Fluid Level and Producing Rate) (Act 315, P.A. 1969, as amended)

all prod. equip. removed from location. Location leveled, contoured & restored as near as possible to its original condition.

CERTIFICATION

e that I am authorized by said Owner or Operator to make this report; and that this report was prepared under my supervision irection, and that the facts stated herein are true, correct and complete to the best of my knowledge."

ID TITLE (Typed or Printed)	SIGNATURE	DATE
ERK ROMUS - CONSULTANT	Jack Rohr	10-3-91

ONDS CANNOT BE RELEASED UNTIL PLUGGING IS COMPLETED, CELLAR, RAT AND MOUSE HOLES, AND PITS FILLED, SITE LEVELED AND CLEANED AND S FILED.

FOR DNR USE ONLY — FINAL INSPECTIONS BY DEPARTMENT OF NATURAL RESOURCES REPRESENTATIVES

SIGNATURE	DIVISION	DATE
Jerome F. Wendell	Geol. Survey	10/3/91

ATTACHMENT D

UNDERGROUND SOURCES OF DRINKING WATER

Geology

The Glacial Drift is the only source of groundwater in Grand Traverse County. The Glacial Drift consists of gravel, sand, silt and clay. These unconsolidated deposits ranges in thickness from 100 to 900 feet. Most domestic wells in the County are 50 to 150 feet deep and yield at least 20 GPM. Industrial wells generally deeper than 150 feet are at times capable of producing 250 GPM. The U.S. Geological Survey Investigation Report 90-4122 333 published in 1990 showed fresh water flow in the vicinity of the Weber 4-8 to be towards the Southwest. This same report listed the generalized depth to water-bearing deposits in the area to be 150 to 200 feet.

The base of the drift (top of Coldwater shale) was encountered at 781′ G.L. (+324′ above Sea Level) in the Weber No. 4-8. The four other penetrations within the 1/4-mile Area of Review encountered the base of the drift between 319′ and 343′ above sea level

Bedrock Aquifers

Bedrock in the area is the Coldwater shale of Paleozoic age. The shale is described as being light to medium gray in color, firm and slightly calcareous. The Coldwater is about 725 feet thick at the Weber 4-8 wellsite and is underlain with the Antrim shale.

Water Quality

Nineteen samples of groundwater were collected in Mayfield Township, Grand Traverse County in 1985. Analyses by the U.S. Geological Society were as follows:

Specific Conductance			Nitrate			Chloride		
Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.
932	516	251	8.8	2.4	0.1	96	15	0.6

Glacial Drift & Water Supply

Figure D-1 shows the 1/4 mile AOR and all water wells found within Section 8, the West Quarter of Section 9, the South Quarter of Section 5 of Township 25 North, Range 11 West of Grand Traverse County Michigan. Information on these water wells is summarized on Table D-1. Water well records are at the end of this Attachment.

Figure D-2 shows the Water-table Configuration in Grand Traverse County, Michigan. Figure D-3 shows the Generalized Depth to Water-bearing Deposits in Grand Traverse County, Michigan.

Water Quality Data, Water-table Configuration and Generalized Depth to water-bearing deposits is from:

"HYDROLOGICAL AND LAND USE IN GRAND TRAVERSE COUNTY, MICHIGAN U.S." *Geological Survey,* Water-Resources Investigations Report 90-4122. Prepared in cooperation with: Grand Traverse County and the Michigan Department of Natural Resources Geological Survey Division.

Figure D-4 is an Isopac of Drift Thickness in Grand Traverse County, Michigan.

Drift Isopac Map from:

"GRAND TRAVERSE COUNTY DRIFT THICKNESS MAP" by C. Robert Reszka, drawn by Gregory A. Wilson. Department of Natural Resources Geological Survey Division #3772 DT, Posted 1-18-2005.

Figure D-1

Map showing all water wells found within the West quarter of Section 9, South quarter of Section 5 and all of Section 8 of T25N, R11W, Grand Traverse County MI.

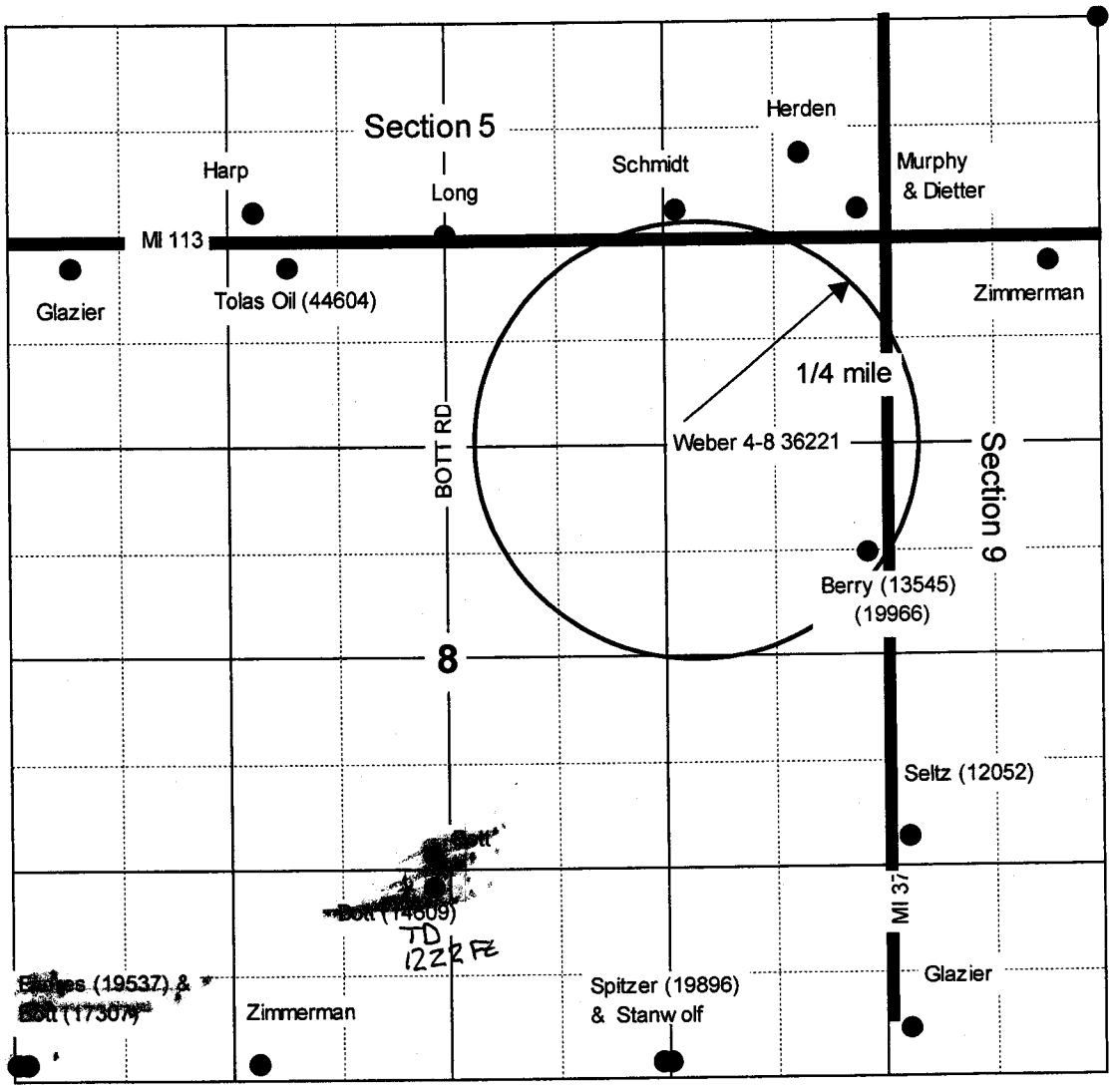


TABLE D-1

Water wells within the West quarter of Section 9, South quarter of Section 5 and all of Section 8 of T25N, R11W, Grand Traverse County MI. (Data From - www.deq.state.mi.us/well-logs/)

Section	Owner of Well (As per permit)	Permit No.	Location	SHL QQQ	Date Completed	[redacted]
5	Joe Harp	-	Miller Rd. 3/4 mi. west of M37	SWSESW	9/7/1973	214
5	Allen Dietter	-	Jct M37 & M113	SESESE	9/16/1971	93
5	Fred Murphy	-	Corner M37 & Miller Rd.	SESESE	8/1/1974	80
5	Wes Herden	-	1/10 mi. NW of Jct M37 & M113	SESESE	10/23/1978	80
5	Schmidt Real Est.	-	Miller Rd. 1/4 mi. west of M37	SWSESE	2/20/1980	105
8	Ken Berry	13545	0.4 mi. S. of M113 on w. side of M37	SESENE	6/9/1986	81
8	Chris M. Bott	17307	Appr. 1 mi. W. of M37 on N. side Harrand Rd.	SWSWSW	8/9/1981	232
8	Steve Endres	19537	5170 West Harrant Rd.	SWSWSW	8/8/1991	181
8	Ronald W. Spitzer	19876	1/4 mi. W. of M37 On Harrand Rd.	E1/2SWSE	9/13/1991	244
8	Stanwolf		1/4 mi. W. of M37 On Harrand Rd.	SWSESE	9/15/1978	122
8	Tolas Oil & Gas Co.	44604	Lease Miller 1-8	NWNENW	11/5/1991	229
8	Gerald Glazier		1/2 mi. of Bott rd. on Miller Rd.	NWNW	10/16/1978	190
8	Dean Bott	14609	Off Harrand Rd. on W. side of Bott Rd	NESESW	7/16/1987	[redacted]
8	Jack Zimmerman		3/4 mi. W. of M37 On Harrand Rd.	SESWSW	8/4/1987	109
8	Greg Bott		3/4 mi. on Bott Rd S. from Miller Rd.	NESW	8/3/1978	107
9	Gerald Glazier		150' E. of M37 & 300' N. of Harrand Rd	SWSWSW	4/23/1970	129
9	Richard Seltz	12052	Bet. M113 & Harrand Rd. on E. side M37	SWNWSW	3/11/1985	153
9	Jack Zimmerman		0.2 mi. E. of M37 on S. side M113	NENWNW	3/6/1984	70

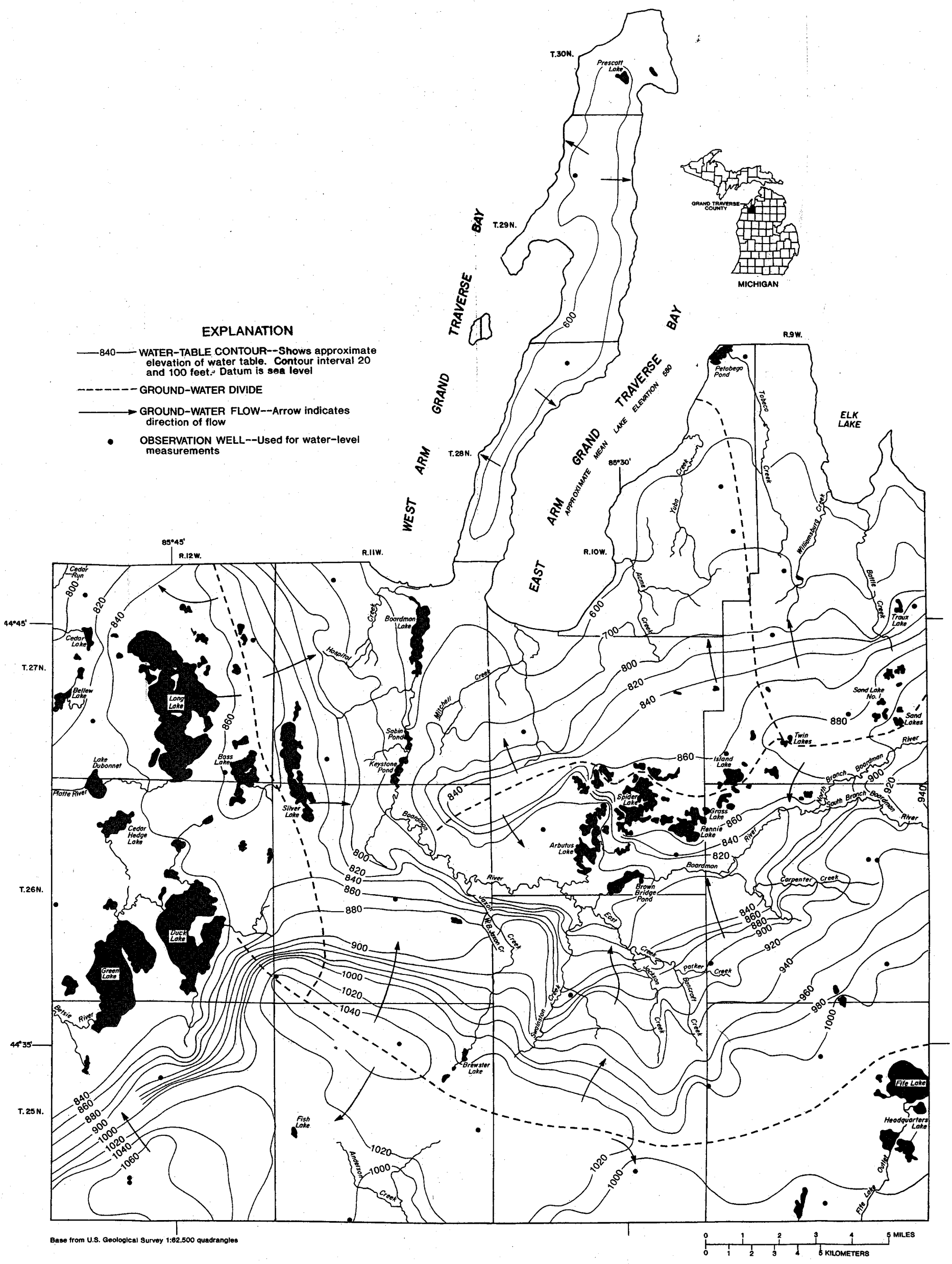
This is a typo should be 122' based on Water well record

Figure D-2

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Prepared in cooperation with
GRAND TRAVERSE COUNTY and the
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WATER-RESOURCES INVESTIGATIONS REPORT 90-4122
Plate 2



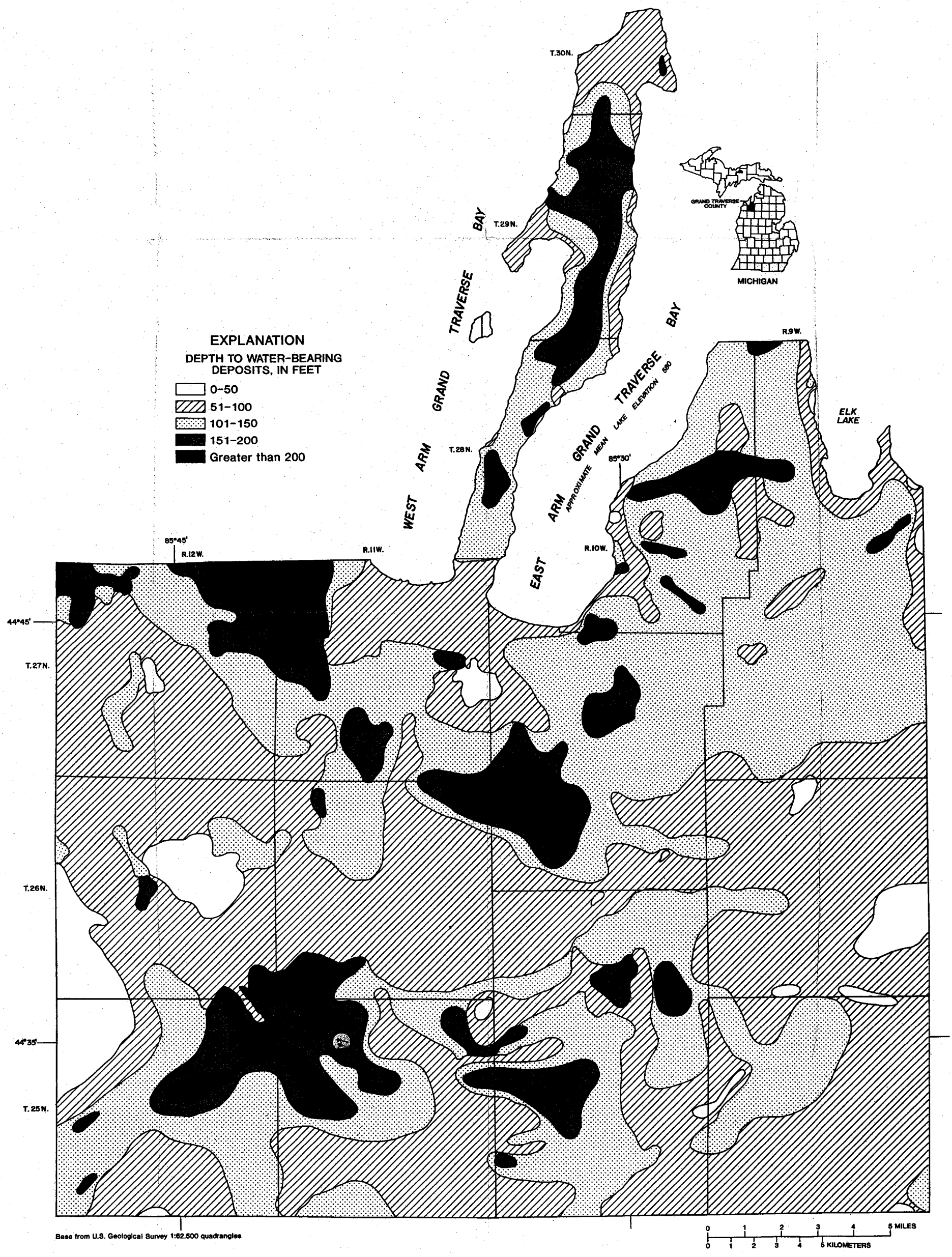
Water-table configuration in Grand Traverse County, Michigan.

Figure D-3

DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

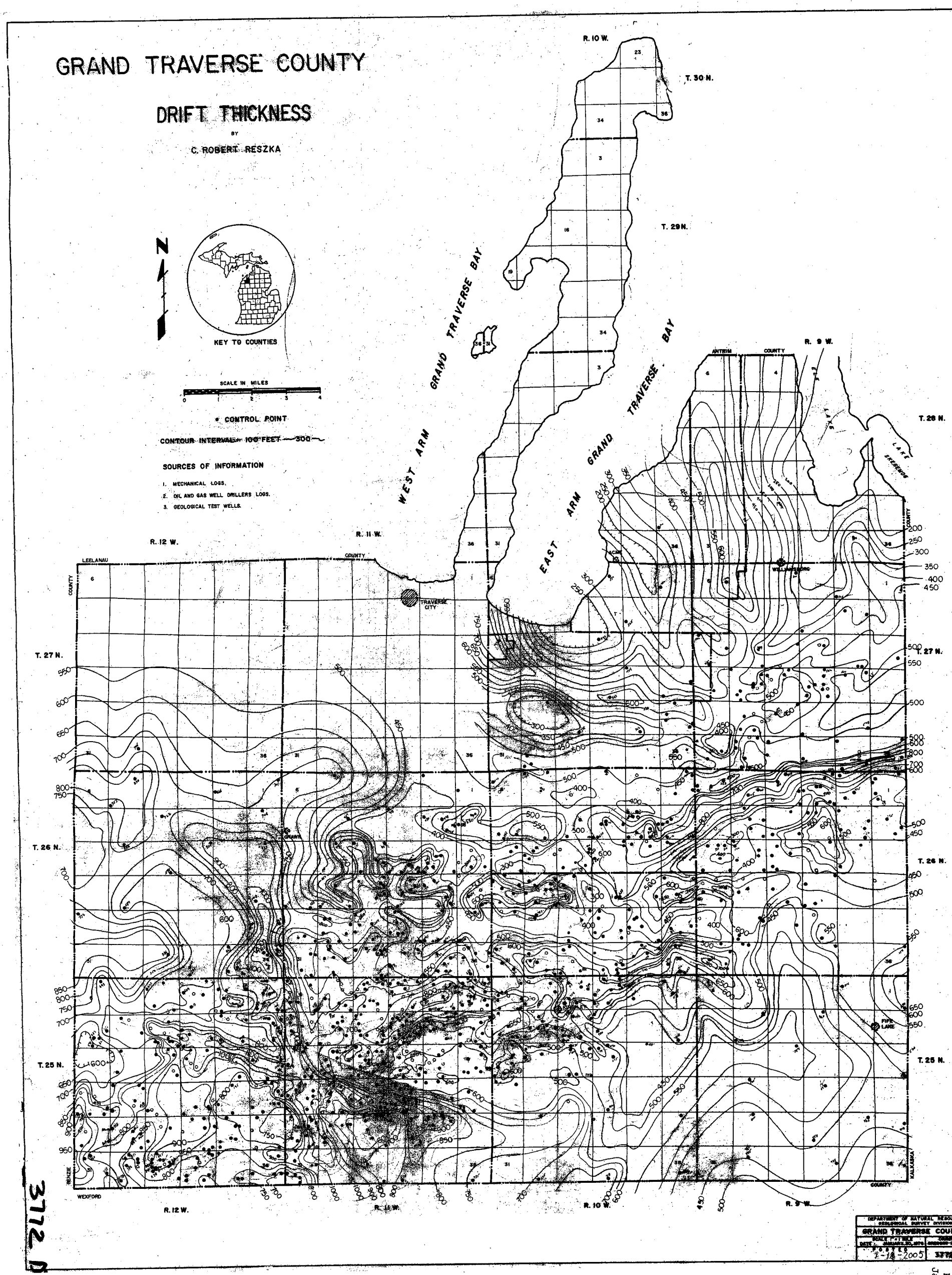
Prepared in cooperation with
GRAND TRAVERSE COUNTY and the
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

WATER-RESOURCES INVESTIGATIONS REPORT 90-4122
Plate 3



Generalized depth to water-bearing deposits in Grand Traverse County, Michigan.

Figure D-4



3712 D

GEOLOGICAL SURVEY SAMPLE No.

NOV 01 1973

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

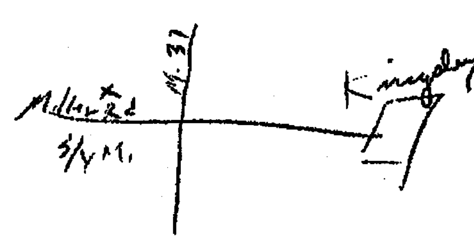
County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	Mayfield	SW¼ SE¼ SW¼	5	26 N	11 W.

Distance And Direction from Road Intersections: 3/4 Mi W. of M-37 on Miller Rd

Street address & City of Well Location: Kingsley, Mich

Locate with "X" in section below (N / S / E / W; 1 MILE) — X marked in south part of section

Sketch Map:



3 OWNER OF WELL: Joe & Gerald Harp

Address: Kingsley, Mich

4 WELL DEPTH: (completed) 214 ft. Date of Completion: Sept 7, 1973

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ____

6 USE: [X] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ]

7 CASING: Threaded [ ] Welded [ ]
Diam. 4 in. to 210 ft. Depth; ____ in. to ____ ft. Depth
Height: Above/Below Surface ____ ft.
Weight ____ lbs./ft.
Drive Shoe? Yes [X] No [ ]

2

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Clay	7	7
Sand	40	47
Clay	20	67
Sand Fine	80	147
Fine Sand + water	40	187
Clay	20	207
Course Sand + water		

USE A 2ND SHEET IF NEEDED

8 SCREEN:
Type: Stainless Dia.: 3"
Slot/Gauze 7 Length 48"
Set between 210 ft. and 214 ft.
Fittings: K Packer + 2' ext.

9 STATIC WATER LEVEL
____ ft. below land surface

10 PUMPING LEVEL below land surface
170 ft. after 3 hrs. pumping 12 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adapter [ ] 12" Above Grade

13 Well Grouted? [X] Yes [ ] No
[X] Neat Cement [ ] Bentonite [ ]
Depth: From 5 ft. to 80' ft.

14 Nearest Source of possible contamination
80 feet W Direction Septic Tank Type
Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed
Manufacturer's Name Goulds
Model Number 5 11 Stage HP ½ Volts 115
Length of Drop Pipe 189 ft. capacity 9 G.P.M.
Type: [X] Submersible [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.
ADDED INFO. BY DRILLER
CORRECTED
CONDITION

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Benson Well Drilling — 0778
REGISTERED BUSINESS NAME — REGISTRATION NO.
Address: Mesick, Mich.
Signed: Donald Benson — AUTHORIZED REPRESENTATIVE — Date: Sept. 10, 1973

D67d 100M (Rev. 12-68)

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GEOLOGICAL SURVEY SAMPLE No. [ ]

MAR 2 3 1972

Page D-9

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

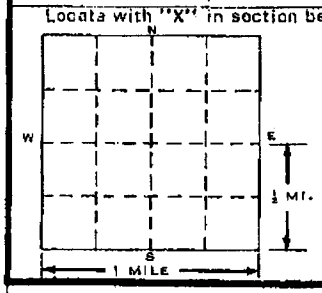
County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	NE¼ SE¼ SE¼	5	25 N/S.	11 E/W.

Distance And Direction from Road Intersections

JCT. of M-37 - M113

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:

3 OWNER OF WELL:

Address ALLEN DIETTER

4 WELL DEPTH: (completed) 92 ft. **Date of Completion** 9-16-71

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☒ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☐ Diam. 2 in. to 87 ft. Depth; ____ in. to ____ ft. Depth

Height: Above/Below Surface ____ ft. Weight 3.75 lbs./ft. Drive Shoe? Yes ☐ No ☐

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
CLAY	10	10
GRAVEL	30	40
CLAY	10	50
SAND	25	75
WATER SAND	17	92

USE A 2ND SHEET IF NEEDED

8 SCREEN:

Type: BRASS Dia.: 1 1/4" Gauge 60 Length 5' Set between 87 ft. and 92 ft.

Fittings:

9 STATIC WATER LEVEL 74 ft. below land surface

10 PUMPING LEVEL below land surface

____ ft. after ____ hrs. pumping ____ g.p.m.

____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ____ Chlorides (Cl) ____

Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No ☐ Neat Cement ☐ Bentonite ☐ ____

Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination

____ feet ____ Direction ____ Type

Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☐ Not Installed

Manufacturer's Name RAPIDAY TON

Model Number 2 stage HP 1 Volts 230

Length of Drop Pipe 781 ft. capacity ____ G.P.M.

Type: ☐ Submersible ☒ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

DRILLER, ITEM #4

*CORRECTED BY:

*CORRECTION BY:

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

PHILS WELL DRILLING 0481

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 10785 Grandview Rd T.C

Signed Phil Skrzynski Date 10-21-71

AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. [ ]

Page D-10

2 SEP 2 1974

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

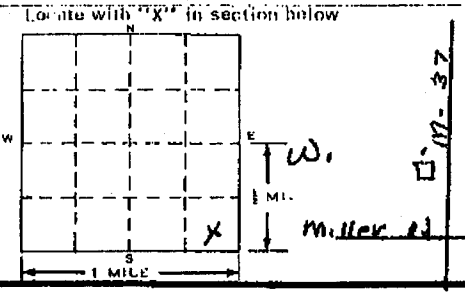
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	May Field	SE ¼ SE ¼ SE ¼	5	25 N/S.	11 W.

Distance And Direction from Road Intersections: Conner M-37 & Miller Rd. Kingsley Mich.

Street address & City of Well Location

Locate with "X" in section below



Sketch Map: N.

3 OWNER OF WELL: Fred Murphy.

Address: Kingsley, Michigan

4 WELL DEPTH: (completed) 80 ft. Date of Completion 8-1-74

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☒ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☐ Welded ☐ Diam. 4 in. to 75 ft. Depth; ____ in. to ____ ft. Depth. Height: Above/Below Surface 1 ft. Weight 11.00 lbs./ft. Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
CLAY	25	25
DRY SAND	43	68
WATER SAND	18	86

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: DRIVE Dia.: 4" Slot/Gauge 12 Length 5' Set between 75 ft. and 80 ft.

Fittings: LEAD COLLAR

9 STATIC WATER LEVEL 60 ft. below land surface

10 PUMPING LEVEL below land surface ____ ft. after ____ hrs. pumping ____ g.p.m. ____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☒ 12" Above Grade

13 Well Grouted? ☐ Yes ☒ No ☐ Neat Cement ☐ Bentonite ☐ ____ Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination 60 feet SW Direction septic Type

Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☒ Not Installed

Manufacturer's Name ____

Model Number ____ HP ____ Volts ____

Length of Drop Pipe ____ ft. capacity ____ G.P.M.

Type: ☐ Submersible ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO.

CORRECTED BY

ADDITION BY

ELEVATION

DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

CISS WELL DRLG CO. (REGISTERED BUSINESS NAME) 1244 (REGISTRATION NO.)

Address 6410 CENTER RD TRAVERSE City, Mich.

Signed Frank W Wozniacki (AUTHORIZED REPRESENTATIVE) Date 8-5-74

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

JAN 16 1979

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

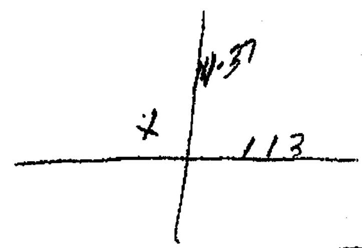
County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	Mayfield	NE¼ SE¼ SE¼	5	T25 N/S.	R11 E/W.

Distance And Direction from Road Intersections: 1/10 MILE N.W. of INTERSECTION M-37 + 113

Street address & City of Well Location

Locate with "X" in section below — N, S, E, W, ½ MI., 1 MILE — X

Sketch Map:



3 OWNER OF WELL: Wes Herndon

Address 7072 M-37 S, Kingsley Mich.

4 WELL DEPTH: (completed) 80 ft. Date of Completion 10-23-78

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☒ Bored ☐

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Diam. 4 in. to 76 ft. Depth; ___ in. to ___ ft. Depth. Height: Above/Below Surface ___ ft. Weight 11 lbs./ft. Drive Shoe? Yes ☐ No ☒

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Clay	20	20
Sand Clay	36	56
Water sand	24	80

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: WESCO Dia.: 4 Slot/Gauze 10 Length 4 Set between 76 ft. and 80 ft. Fittings: Coup

9 STATIC WATER LEVEL 56 ft. below land surface

10 PUMPING LEVEL below land surface: 70 ft. after 1 hrs. pumping 12 g.p.m.; ___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ___ Chlorides (Cl) ___ Hardness ___ Other ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No ☐ Neat Cement ☐ Bentonite ☒ mud. Depth: From 0 ft. to 56 ft.

14 Nearest Source of possible contamination: 75 feet N Direction SEPTIC Type. Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not Installed. Manufacturer's Name FLINT + WALLING. Model Number 513A8 HP ½ Volts 230. Length of Drop Pipe 65 ft. capacity 12 G.P.M. Type: ☒ Submersible ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO.
*CORRECTED BY
**ADDITION BY
ELEVATION
DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

[Registered Business Name] ... Well Drilling Co. — Registration No. 1244

Address 6410 ... Traverse City Mich.

Signed [signature] AUTHORIZED REPRESENTATIVE Date 10-23-78

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. [ ]

APR 30 1980

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

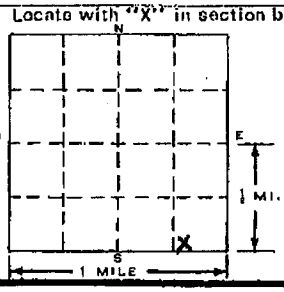
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	SW¼SE¼SE¼	~~27~~ 37	25 N/S.	11 E/W.

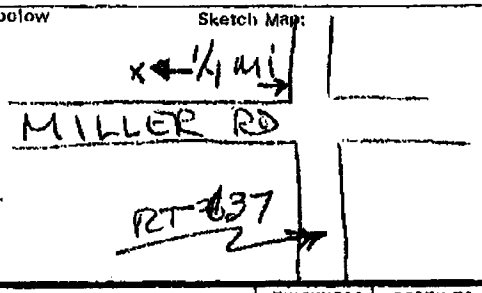
Distance And Direction from Road Intersections: MILLER RD 1/4 Mi. W of RT #37

Street address & City of Well Location: MAYFIELD, MI 49666

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: SCHMIDT REAL ESTATE

Address: 402 E. FRONT ST. TRAVERSE CITY, MI. 49684

4 WELL DEPTH: (completed) 105 ft. Date of Completion 2-22-80

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☐ Welded ☒ Height: Above/~~Below~~ Surface ____ ft.

Diam. 5" in. to PVC 100 ft. Depth; Weight 200 lbs./ft.

____ in. to ____ ft. Depth; Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
CLAY & GRAVEL	2	2
CLAY	13	15
SAND & GRAVEL	59	74
Sand	31	105

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: STAINLESS Dia.: 2 INCH

Slot/~~Gauze~~ 10 Length 5 FEET

Set between 100 ft. and 105 ft.

Fittings: K-PACKER - PLUG BOTTOM

9 STATIC WATER LEVEL 57 ft. below land surface

10 PUMPING LEVEL below land surface

____ ft. after ____ hrs. pumping ____ g.p.m.

____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY In Parts Per Million:

Iron (Fe) ____ Chlorides (Cl) ____

Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adaptor ☐ 12" Above Grade

13 Well Grouted? ☐ Yes ☒ No ☐ Neat Cement ☐ Bentonite ☐ ____

Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination: 50 foot NE Direction SEPTIC Type

Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not installed

Manufacturer's Name AERMOTOR

Model Number SD8-50 HP ½ Volts 230

Length of Drop Pipe 85 ft. capacity 8 G.P.M.

Type: ☒ Submersible ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO.

*CORRECTED BY

**ADDITION BY

ELEVATION

DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

B&Z WELL DRILLING 1647

REGISTERED BUSINESS NAME REGISTRATION NO.

Address MAPLE CITY, MI. 49664

Signed [signature] AUTHORIZED REPRESENTATIVE Date 2/27/80

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PERMIT NUMBER 1 3545

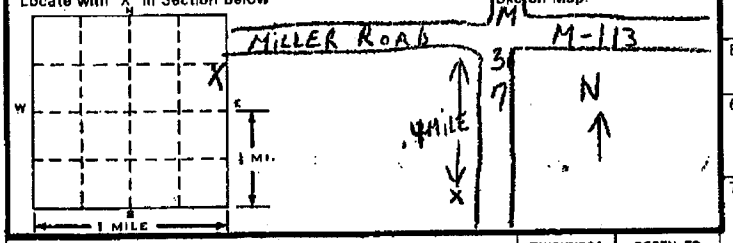
1 LOCATION OF WELL

County: GRAND TRAVERSE | Township Name: MAYFIELD | Fraction: SE ¼ SE ¼ NE ¼ | Section Number: 8 | Town Number: T.25 N/S | Range Number: R.11 E/W

Distance And Direction From Road Intersection: .4 MILE SOUTH OF M-113 ON M-37, WEST SIDE OF ROAD.

Street Address & City of Well Location: 7390 M-37 SOUTH

Locate with "X" in Section Below | Sketch Map:



3 OWNER OF WELL: KEN BERRY

Address: 7390 M-37 SOUTH

Address Same As Well Location? ☒ Yes ☐ No

4 WELL DEPTH: (completed) 81 ft. | **Date of Completion** 6-9-86

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐ _____

6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING: Diameter ☐ Steel ☐ Threaded ☒ Plastic ☒ Welded

5 in. to 76 ft. depth

_____ in. to _____ ft. depth

Grouted Drill Hole Diameter

6¼ in. to 81 ft. depth

_____ in. to _____ ft. depth

Height: Above/Below Surface 1 ft.

Weight 3 lbs./ft

Drive Shoe ☐ Yes ☒ No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND	70	70
GRAVEL	40	60
CLAY	1	61
WATER SAND	20	81

USE A 2ND SHEET IF NEEDED

8 SCREEN: ☐ Not Installed

Type PVC Diameter 4 INCH

Slot/Gauge 10 Length 5 FEET

Set between 76 ft. and 81 ft.

FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen _____ ft. Other _____

9 STATIC WATER LEVEL 35 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface

_____ ft. after _____ hrs. pumping at _____ G.P.M.

_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From _____ to _____ ft.

☐ Neat cement ☒ Bentonite ☒ Other SAND

No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination

Type SEPTIC Distance 50 ft. Direction _____

Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP: ☐ Not Installed ☐ Pump Installation Only

Manufacturer's name RED JACKET

Model number 2W HP 1½ Volts 230

Length of Drop Pipe 60 ft. capacity 10 G.P.M.

TYPE: ☒ Submersible 1" ☒ PVC

PRESSURE TANK: X-TROL

Manufacturer's name _____

Model number WX202 Capacity 40 Gallons

15. Remarks, elevation, source RECEIVED

Mich. Dept. of Public Health

SEP 22 1986

Bureau of Environmental and Occupational Health - GWQS

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

PHILS WELL DRILLING 0481

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 10785 GRANDVIEW RD T.C.

Signed Phil Sharnoski Date 6-13-86

AUTHORIZED REPRESENTATIVE

Authority: Act 368 PA 1978

Completion: Required

Penalty: Conviction of a violation of any provision is a misdemeanor.

D67d 2/84

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO. [ ]

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

17307
PERMIT NUMBER

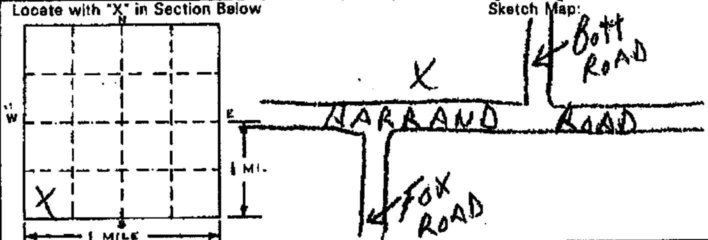
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	SW 1/4 SW 1/4 SW 1/4	8	T.25 N/S	R. 11 E/W

Distance And Direction From Road Intersection: APPROXIMATELY 1 MILE WEST OF M-37 ON NARRAND ROAD NORTH SIDE OF ROAD

Street Address & City of Well Location: NARRAND ROAD

Locate with "X" in Section Below — Sketch Map:



3 OWNER OF WELL: CHRIS M. BOTT

Address: 336 N.E. SILVER LAKE RD

Address Same As Well Location? [ ] Yes [X] No

4 WELL DEPTH: 232 ft. Date Completed: 8-9-89 [X] New Well [ ] Replacement Well

5 [ ] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ]

6 USE: [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ]

7 CASING: Diameter 5" [ ] Steel [ ] Threaded [X] Plastic [ ] Welded
5 in. to ___ ft. depth
___ in. to 232 ft. depth
Height: Above/Below Surface ___ ft.
Weight SDR-21 lbs./ft.
Drilled Hole Diameter
7 7/8 in. to ___ ft. depth
___ in. to 232 ft. depth
Drive Shoe [ ] Yes [ ] No

2

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand & stones	0	60
GRAVEL	60	85
Sand & Gravel	85	102
Sand & Clay	102	128
Clay & silt	128	210
Clay	210	222
Sand	222	232
Rig 41066		

USE A 2ND SHEET IF NEEDED

8 SCREEN: [ ] Not Installed
Type PVC Diameter 4"
Slot/Gauze 10 Length 5 Ft.
Set between 227 ft. and 232 ft.
FITTINGS: [X] K-Packer [ ] Lead Packer [ ] Bremer Check
[ ] Blank above screen ___ ft. Other ___

9 STATIC WATER LEVEL: 130 ft. below land surface [ ] Flow

10 PUMPING LEVEL: below land surface
___ ft. after ___ hrs. pumping at ___ G.P.M.
___ ft. after ___ hrs. pumping at ___ G.P.M.

11 WELL HEAD COMPLETION: [X] Pitless adapter [ ] 12" above grade [ ] Basement offset [ ] Approved pit

12 WELL GROUTED? [ ] No [X] Yes From ___ to ___ ft.
[ ] Neat cement [ ] Bentonite [X] Other W/clay
No. of bags of cement ___ Additives ___

13 Nearest source of possible contamination
Type Septic Distance 50 ft. Direction ___
Well disinfected upon completion? [X] Yes [ ] No
Was old well plugged? [ ] Yes [ ] No

14 PUMP: [ ] Not installed [ ] Pump Installation Only
Manufacturer's name Red JACKET
Model number 2-W HP 3/4 HP Volts 230
Length of Drop Pipe 215 ft. capacity 10 G.P.M.
TYPE: [X] Submersible [ ] Jet
PRESSURE TANK:
Manufacturer's name Well Extrol
Model number WX 203 Capacity 80 Gallons

15. Remarks, elevation, source of data, etc.

17. Rig Operator's Name: Bob Nelson

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Phil's Well Drilling 0401
REGISTERED BUSINESS NAME — REGISTRATION NO.
Address 10785 Grandview Rd. T.C.
Signed Phil Shumsky (?) Date 8/10/89
AUTHORIZED REPRESENTATIVE

D67d 12/86

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NUMBER 1/9337

1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	Mayfield	SW1/4 SW1/4 SW1/4	8	25 N/S	11 E/W

Distance And Direction From Road Intersection

5170 West Harvard Rd.

Street Address & City of Well Location

Locate with "X" in Section Below — Sketch Map:

3 OWNER OF WELL: Steve Endres
Address: 5170 West Harvard Rd, Buckley, Mich
Address Same As Well Location? ☐ Yes ☐ No

4 WELL DEPTH: 181 FT. Date Completed 8 8 91 ☒ New Well ☐ Replacement Well

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE: ☒ Domestic ☐ Irrigation ☐ Test Well ☐ Type I Public ☐ Type IIa Public ☐ Type IIb Public ☐ Type III Public ☐ Heat pump ☐

7 CASING: Diameter 5" ☐ Steel ☒ Plastic ☐ Threaded ☐ Welded
Height. Above/Below Surface SDR-21 ft.
__ in. to __ ft. depth
__ in. to 181 ft. depth
Weight ____ lbs./ft.
Grouted Drill Hole Diameter
7 7/8 in. to __ ft. depth
__ in. to 181 ft. depth
Drive Shoe ☐ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand Gravel & Rocks	0 -	63
Clay & Sand	63 -	105
Sand & Gravel & silt	105 -	112
Silt & Clay	112 -	176
Sand	176 -	181

USE A 2ND SHEET IF NEEDED

RECEIVED
DEC 31 1991
GRAND TRAVERSE COUNTY HEALTH DEPARTMENT

91-80704 15th.

RECEIVED
Mich. Dept. of Public Health
JAN 10 1992
BUREAU OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH-GWQS

8 SCREEN: ☐ Not Installed
Type Wellscreen Diameter 4"
Slot/Gauze 10 Length 5 Ft.
Set between 176 ft. and 181 ft.
FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check
☒ Blank above screen 2 ft. Other ____

9 STATIC WATER LEVEL: 160 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface
____ ft. after ____ hrs. pumping at ____ G.P.M.
____ ft. after ____ hrs. pumping at ____ G.P.M.

11 WELL HEAD COMPLETION: ☒ Pitless adaptor ☐ Basement offset ☐ 12" above grade ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From 0 to 25 ft.
☐ Neat cement ☒ Bentonite ☒ Other Volclay
No. of bags of cement ____ Additives ____

13 Nearest source of possible contamination
Type Septic Distance 50 ft. Direction ____
Well disinfected upon completion? ☒ Yes ☐ No
Was old well plugged? ☐ Yes ☐ No

14 PUMP: ☐ Not Installed ☐ Pump Installation Only
Manufacturer's name Red Jacket
Model number 2-W HP 3/4 HP Volts 230
Length of Drop Pipe 170 ft. capacity 10 G.P.M.
TYPE: ☒ Submersible ☐ Jet
PRESSURE TANK:
Manufacturer's name Well Extrol
Model number WX 203 Capacity Well Extrol Gallons

16. Remarks, elevation, source of data, etc.

15. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Phils Well Drilling 0481
REGISTERED BUSINESS NAME — REGISTRATION NO.
Address 3383 Kenwie School Rd. T.C.
Signed Paul F King Date 8/9/91
AUTHORIZED REPRESENTATIVE

17. Rig Operator's Name: Doug Schettek

D67d 2/89

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

28-09-008-014-00

PERMIT NUMBER 19896

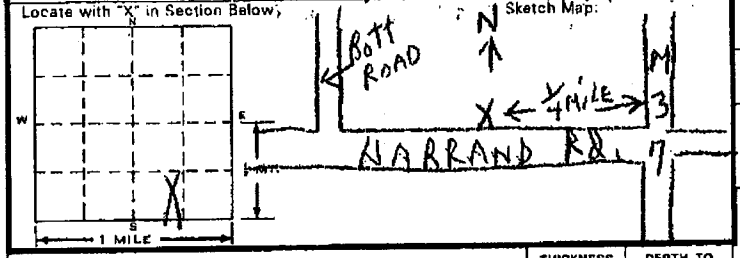
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	E½ NW¼ SW¼ SE¼	8	T 25 N/S	R 11 E/W

Distance And Direction From Road Intersection: ¼ MILE WEST OF M-37 ON HARRAND ROAD.

Street Address & City of Well Location: HARRAND ROAD

Locate with "X" in Section Below; Sketch Map:



3 OWNER OF WELL:

RONALD W. SPITZER

Address: 6572 ZUE ROAD, BUCKLEY, MI.,

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH:

244 FT.

Date Completed: MO. 9 DAY 13 YEAR 91

☒ New Well ☐ Replacement Well

5

☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug

☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE:

☒ Domestic ☐ Type I Public ☐ Type III Public

☐ Irrigation ☐ Type IIa Public ☐ Heat pump

☐ Test Well ☐ Type IIb Public ☐

7 CASING:

Diameter: ☐ Steel ☐ Threaded ☒ Plastic ☐ Welded

5 in. to 234 ft. depth

____ in. to ____ ft. depth

Grouted Drill Hole Diameter: 7 7/8 in. to 244 ft. depth

____ in. to ____ ft. depth

Height: (Above)/Below

Surface 1 ft.

Weight ____ lbs./ft.

Drive Shoe ☐ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Topsoil	1	1
Red and tanye gravel	149	150
Gray clay	10	160
Fine tan sand	70	230

8 SCREEN:

☐ Not Installed

Type PVC Diameter 4"

Slot/Gauze 16 Length 10'

Set between 234 ft. and 244 ft.

FITTINGS: ☐ K-Packer ☐ Lead Packer ☐ Bremer Check

☐ Blank above screen ____ ft. Other ____

9 STATIC WATER LEVEL:

150 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface

175 ft. after 1 hrs. pumping at 14 G.P.M.

____ ft. after ____ hrs. pumping at ____ G.P.M.

11 WELL HEAD COMPLETION:

☒ Pitless adapter ☒ 12" above grade

☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☐ No ☒ Yes From 10 ft. to 25 ft.

☐ Neat cement ☒ Bentonite ☐ Other ____

No. of bags of cement ____ Additives ____

13 Nearest source of possible contamination

Type Septic Distance 70 ft. Direction West

Well disinfected upon completion? ☒ Yes ☐ No

Was old well plugged? ☐ Yes ☐ No

14 PUMP:

☐ Not Installed ☐ Pump Installation Only

Manufacturer's name Flint & Walling

Model number 4F10307 HP 3/4 Volts 230

Length of Drop Pipe 200 ft. capacity 12 G.P.M.

TYPE: ☒ Submersible ☐ Jet ____

PRESSURE TANK:

Manufacturer's name ____

Model number ____ Capacity 44 Gallons

RECEIVED
Mich. Dept. of Public Health
JAN 10 1992
BUREAU OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH-GWDS

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

17. Rig Operator's Name: Steve Johnson

WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

1908

REGISTERED BUSINESS NAME ____ REGISTRATION NO.

Address ____

Signed ____ AUTHORIZED REPRESENTATIVE Date 10/1/91

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

D87d 2/89

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. [ ]

JAN 16 1979

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

2

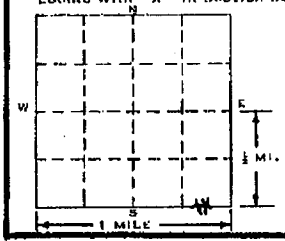
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand T.C.	MAYFIELD	SW ¼ SE ¼ SE ¼	8	25 N/S.	R 11 E/W.

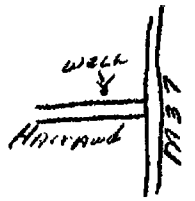
Distance And Direction from Road Intersections: ¼ mile west of M37 on Harrand Rd

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: STAN Wolf

Address

4 WELL DEPTH: (completed) 122 ft. **Date of Completion** 9-15-78

5 ☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☒ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐

7 CASING: Threaded ☒ Welded ☐ Diam. 4 in. to 118 ft. Depth; ____ in. to ____ ft. Depth. Height: Above/Below Surface 1 ft. Weight ____ lbs./ft. Drive Shoe? Yes ☐ No ☒

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Dry SAND + CLAY	100	100
WATER SAND	22	122

8 SCREEN: Type: STAINLESS Dia.: 4" Slot ~~Gauge~~ 10 Length 4' Set between 118 ft. and 122 ft. Fittings:

9 STATIC WATER LEVEL 100 ft. below land surface

10 PUMPING LEVEL below land surface 105 ft. after 1 hrs. pumping 20 g.p.m. ____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☐ Yes ☐ No ☒ Neat Cement ☐ Bentonite ☐ ____ Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination 60 feet N Direction ____ Type ____ Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not installed Manufacturer's Name F x W Model Number ____ HP ½ Volts 220 Length of Drop Pipe 115 ft. capacity 5 G.P.M. Type: ☒ Submersible ☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO.
CORRECTED BY
ADDITION BY
ELEVATION
DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Dan Inman Well Drilling — REGISTERED BUSINESS NAME — REGISTRATION NO.

Address 4689 Boise River Rd 1286

Signed Dan Inman — AUTHORIZED REPRESENTATIVE — Date 10-10-78

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY DIVISION
P O BOX 30028
LANSING, MICHIGAN 48909

ACT 315 PA 1969

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LOG OF OIL, GAS OR MINERAL WELL WATER WELL
SUBMIT IN TRIPLICATE WITHIN 30 DAYS AFTER WELL COMPLETION

1. LOCATION DATA

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT: Tolas Oil & Gas Company, 306 E Broadway, Mt Pleasant, MI 48858

NAME & ADDRESS OF DRILLING CONTRACTOR(S):

PERMIT NUMBER: 44604

LEASE NAME(S) & WELL NUMBER SHOWN PERMIT: Miller 1-8

COUNTY: Grand Traverse | TOWNSHIP: Mayfield | FRACTION: NW1/4 NE1/4 NW1/4 | SECTION NO.: 8 | TOWN NO.: 25 N/S | RANGE NO.: 11 E/W

2. FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Red Clay	25	25
Gravel & Red Clay Sand	65	90
Tan Clay	40	130
Gray Clay	75	205
Medium Sand	24	229

(USE A 2ND SHEET IF NEEDED)

3. WELL DEPTH (completed): 229 ft — Date of Completion: 11/05/91

4. [ ] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ]

5. CASING Diameter: 4 — [ ] Steel [X] Plastic [ ] Threaded [ ] Welded — in to 209 ft depth — Height Above/Below Surface 2 ft — Weight ___ lbs/ft — Grouted Drill Hole Diameter — Drive Shoe [ ] Yes [ ] No

6. SCREEN [ ] Not installed
Type Plastic — Diameter 4" — Slot/Gauze 12 — Length 20' — Set between 209 ft and 229 ft
FITTINGS [ ] K Packer [ ] Lead Packer [ ] Bottom Check [ ] Blank above screen ___ ft Other ___

7. STATIC WATER LEVEL: 144 ft below land surface [ ] Flow

8. PUMPING LEVEL below land surface
___ ft after ___ hrs pumping at ___ G.P.M.
___ ft after ___ hrs pumping at ___ G.P.M.

9. WELL GROUTED? [ ] No [X] Yes From ___ to ___
[ ] Neat cement XX Bentonite [ ] Other ___
No. of bags of cement ___ Additives ___

10. PUMP [ ] Not installed [ ] Pump Installation Only
Manufacturer's name ___
Model number ___ HP ___ Volts ___
Length of Drop Pipe ___ ft capacity ___ G.P.H.
TYPE [ ] Submersible [ ] Jet ___

11. REMARKS (ELEVATION, SOURCE OF DATA, WATER QUALITY, ETC.)

(USE A 2ND SHEET OR ATTACH SUPPLEMENTS IF NEEDED)

12. AUTHORIZED REPRESENTATIVE CERTIFICATION (THIS WELL WAS DRILLED UNDER MY AUTHORITY AND THIS REPORT IS TRUE TO THE BEST OF MY KNOWLEDGE AND BELIEF.)

NAME J&R Well Drilling Inc. (PRINT OR TYPE)

ADDRESS Rt. 1 Box 78 Elmira Mi. 49730

SIGNED Ron Shugeck DATE 11/21/91

PR 7200 (Rev.)

GEOLOGICAL SURVEY SAMPLE No.

JAN 16 1979

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

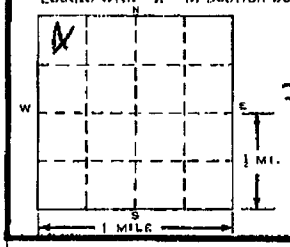
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	May Field	¼NW¼NW¼	8	25 N/S.	11 E/W.

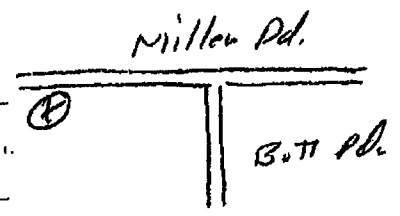
Distance And Direction from Road Intersection: 1/2 mile west of B.T. Rd. on Miller Rd.

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: Gerald Glazier

Address: Traverse City Mich

4 WELL DEPTH: (completed) 190 ft. Date of Completion 10-16-78

5 [X] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ]

6 USE: [X] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ]

7 CASING: Threaded [X] Welded [ ] Height: Above/Below Surface 1 ft.

4 in. to 185 ft. Depth Weight 11.00 lbs./ft.

___ in. to ___ ft. Depth Drive Shoe? Yes [X] No [ ]

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND - Gravel	148	148
clay	4	152
Gravel - Clay	13	165
WATER SAND	25	190

USE A 2ND SHEET IF NEEDED

8 SCREEN:

Type: S.S. Dia.: 4"

Slot/Gauze .010 Length 5'

Set between 185 ft. and 190 ft.

Fittings:

9 STATIC WATER LEVEL

165 ft. below land surface

10 PUMPING LEVEL below land surface

___ ft. after ___ hrs. pumping ___ g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ___ Chlorides (Cl) ___

Hardness ___ Other ___

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adapter [X] 12" Above Grade

13 Well Grouted [X] Yes [ ] No

[ ] Neat Cement [X] Bentonite [X] SAND

Depth: From ___ ft. to ___ ft.

14 Nearest Source of possible contamination

50 feet ___ Direction 540 ft. e Type

Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed

Manufacturer's Name Red Jacket

Model Number 2-W HP 3/4 Volts 230

Length of Drop Pipe 175 ft. capacity 20 G.P.M.

Type: [X] Submersible [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

ADDED INFO BY DRILLER, ITEM NO

*CORRECTED BY

**ADDITION BY

ELEVATION

DEPTH TO ROCK

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Chris Well Drilling 0461

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 10765 Grasshopper Rd T.C.

Signed ___ Date 10-23-78

AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NUMBER: 1 4609

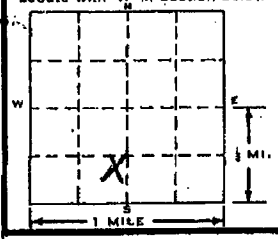
1 LOCATION OF WELL

County: GRAND TRAVERSE | Township Name: MAYFIELD | Fraction: NE¼ SE¼ SW¼ | Section Number: 8 | Town Number: T. 25 N/S | Range Number: R. 11 E/W

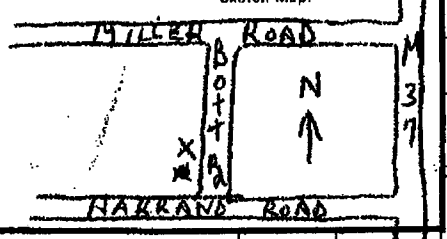
Distance And Direction From Road Intersection: OFF HARRAND ROAD ON BOTT ROAD, WEST SIDE OF ROAD.

Street Address & City of Well Location: BOTT ROAD

Locate with "X" in Section Below



Sketch Map:



3 OWNER OF WELL: DEAN BOTT

Address: 7134 S. HANNAH ROAD

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH: 122 FT. | Date Completed MO. 7 DAY 16 YEAR 87 | ☒ New Well ☐ Replacement Well

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE: ☒ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☐

7 CASING: Diameter ☐ Steel ☐ Threaded ☒ Plastic ☒ Welded

5 in. to 117 ft. depth

in. to ft. depth

Grouted Drill Hole Diameter

7⅞ in. to ft. depth

in. to 122 ft. depth

Height: Above/Below Surface 1 ft.

Weight 3 lbs./ft.

Drive Shoe ☐ Yes ☒ No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND & ROCKS	8	8
SAND & GRAVEL	47	55
GRAVEL	26	81
SAND	41	122

8 SCREEN: ☐ Not Installed

Type PVC Diameter 4 INCH

Slot/Gauze 10 Length 5 FEET

Set between 117 ft. and 122 ft.

FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen ____ ft. Other ____

9 STATIC WATER LEVEL: 82 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface

____ ft. after ____ hrs. pumping at ____ G.P.M.

____ ft. after ____ hrs. pumping at ____ G.P.M.

11 WELL HEAD COMPLETION: ☒ Pitless adapter ☐ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From ____ to ____ ft.

☐ Neat cement ☒ Bentonite ☒ Other VOLCLAY

No. of bags of cement ____ Additives ____

13 Nearest source of possible contamination

Type SEPTIC Distance 50 ft. Direction ____

Well disinfected upon completion? ☒ Yes ☐ No

Was old well plugged? ☐ Yes ☐ No

14 PUMP: ☐ Not Installed ☐ Pump Installation Only

Manufacturer's name RED JACKET

Model number JW HP ½ Volts 230

Length of Drop Pipe 100' ft. capacity ____ G.P.M.

TYPE: ☐ Submersible ☒ Jet 1" PVC

PRESSURE TANK:

Manufacturer's name WELL X-TROL

Model number WX20T Capacity 40 Gallons

RECEIVED
Mich. Dept. of Public Health
SEP 24 1987
Bureau of Environmental and Occupational Health - GWQS

USE A 2ND SHEET IF NEEDED

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

PHIL'S WELL DRILLING 0481
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 10785 GRANDVIEW RD TC

Signed [signature] AUTHORIZED REPRESENTATIVE Date 7-25-87

17. Rig Operator's Name: DOUG SCHETTEK

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

D67d 12/85

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. [ ]

OCT 18 1977

WATER WELL RECORD
ACT 294 PA 1965

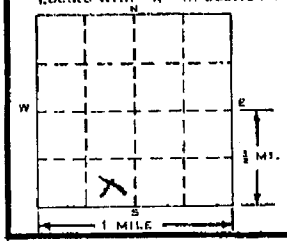
MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

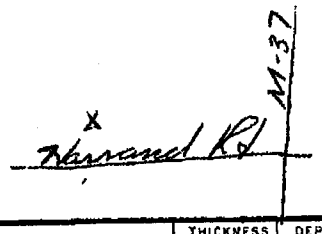
County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	MAYFIELD.	SE¼SW¼SW¼	8	T25 N/S.	R11 E/W.

Distance And Direction from Road Intersections
¾ MILE WEST of M-37 ON HARRAND RD.
Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: Jack Zimmerman
Address 1212 Garfield Ave. Traverse City Mich.

4 WELL DEPTH: (completed) 109 ft. **Date of Completion** 8-4-77

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ____

6 USE: [X] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ] ____

7 CASING: Threaded [X] Welded [ ] Diam. 4 in. to 105 ft. Depth; ____ in. to ____ ft. Depth. Height: Above/Below Surface ____ ft. Weight 11 lbs./ft. Drive Shoe? Yes [X] No [ ]

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand + gravel	60	60
hard gyp	6	66
gravel	34	100
Water sand coarse	9	109

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: Johnson Dia.: 3" Slot/Gauze 12 Length 4' Set between 105 ft. and 109 ft. Fittings: Packer + set link

9 STATIC WATER LEVEL 90 ft. below land surface

10 PUMPING LEVEL below land surface 100 ft. after 1 hrs. pumping 6 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adaptor [ ] 12" Above Grade

13 Well Grouted? [X] Yes [ ] No [ ] Neat Cement [ ] Bentonite [X] sand. Depth: From 20 ft. to 60 ft.

14 Nearest Source of possible contamination 100 feet Dry Direction ____ Type ____ Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed Manufacturer's Name DAYLEX Model Number ____ HP ½ Volts 220 Length of Drop Pipe 100 ft. capacity 10 G.P.M. Type: [X] Submersible [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Duff Well Drilling Co. 1244
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 6410 acme Rd Traverse City Mich.
Signed Albert Kitowski Date 8-8-77
AUTHORIZED REPRESENTATIVE

067d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No.

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

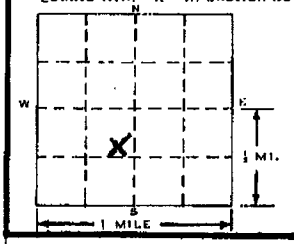
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	¼NE¼SW¼	8	25 N/S.	11 E/W.

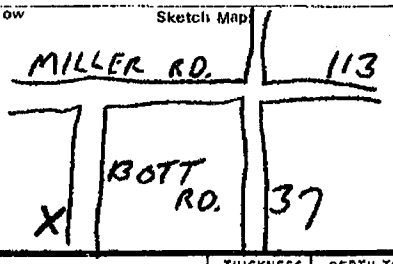
Distance And Direction from Road Intersections: 3/4 MILE ON BOTT RD SOUTH FROM MILLER RD.

Street address & City of Well Location

Locate with "X" in section below



Sketch Map



3 OWNER OF WELL: GREG BOTT

Address: 7700 BOTT RD.

4 WELL DEPTH: (completed) 107 ft. Date of Completion: 8-3-78

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [X] Bored [ ] ____

6 USE: [X] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ] ____

7 CASING: Threaded [X] Welded [ ] Diam. 4 in. to 102 ft. Depth; ____ in. to ____ ft. Depth. Height: Above/~~Below~~ Surface 1 ft. Weight 11.09 lbs./ft. Drive Shoe? Yes [X] No [ ]

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SAND	8	8
GRAVEL	43	51
ROCK	16	67
SAND	15	82
WATER SAND	25	107

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: S.S. Dia.: 4" Slot/~~Gauge~~ .010 Length 5' Set between 102 ft. and 107 ft. Fittings:

9 STATIC WATER LEVEL 82 ft. below land surface

10 PUMPING LEVEL below land surface: ____ ft. after ____ hrs. pumping ____ g.p.m.; ____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adapter [ ] 12" Above Grade

13 Well Grouted? [X] Yes [ ] No [ ] Neat Cement [X] Bentonite [ ] ____ Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination: 50 feet ____ Direction SEPTIC Type. Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed. Manufacturer's Name Red Jacket. Model Number J-10 HP ½ Volts 230. Length of Drop Pipe 90 ft. capacity 10 G.P.M. Type: [X] Submersible [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

PHIL'S WELL DRILLING — REGISTERED BUSINESS NAME — 0481 REGISTRATION NO.

Address: 10785 GRAND VIEW RD. T.C.

Signed: Phil Skarnoski — AUTHORIZED REPRESENTATIVE — Date: 8-3-78

D.M.

D67d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY SAMPLE No. ______

JAN 0 3 1971

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Grand Traverse	May Field	SW¼ SW¼ SW¼	9	25 (N) S.	11 E (W)

Distance And Direction from Road Intersections: 150' E. of M-37, 800' N. of Harrow Rd

Street address & City of Well Location:

Locate with "X" in section below — Sketch Map: (X marked in SW corner; N, S, E, W; ½ MI.; 1 MILE)

3 OWNER OF WELL: Gerald Glazier

Address:

4 WELL DEPTH: (completed) 129 ft. Date of Completion 4-23-70

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ]

6 USE: [X] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ]

7 CASING: Threaded [X] Welded [ ] Diam. 4 in. to 129 ft. Depth; ___ in. to ___ ft. Depth. Height: Above/Below Surface 1 ft. Weight 11 lbs./ft. Drive Shoe? Yes [X] No [ ]

8 SCREEN: Type: Brass Dia. 4" Slot/Gauze .010 Length 5' Set between 124 ft. and 129 ft. Fittings: Lead Packer

9 STATIC WATER LEVEL 103 ft. below land surface

10 PUMPING LEVEL below land surface ___ ft. after ___ hrs. pumping ___ g.p.m.; ___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ___ Chlorides (Cl) ___ Hardness ___ Other ___

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adaptor [ ] 12" Above Grade

13 Well Grouted? [X] Yes [ ] No [ ] Neat Cement [ ] Bentonite [ ] ___ Depth: From ___ ft. to ___ ft.

14 Nearest Source of possible contamination 75 feet NE Direction Tile Field Type. Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed. Manufacturer's Name F×W. Model Number ___ HP ½ Volts 230. Length of Drop Pipe 116 ft. capacity ___ G.P.M. Type: [X] Submersible [ ] Jet [ ] Reciprocating

2 FORMATION

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Clay	20	20
Sand	20	40
Clay	30	70
Gravel	20	90
Water Sand	39	129

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

ADDED DATA BY DRILLER, ITEM NO.

CORRECTED BY:

[illegible] BY:

17 WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Phil's Well Drilling — REGISTERED BUSINESS NAME; 0481 — REGISTRATION NO.

Address 10785 Shandview Rd T/C

Signed Phil Sharnowski — AUTHORIZED REPRESENTATIVE. Date 4-30-70

067d 100M (Rev. 12-68)

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NU[illegible] 1 2052 Page D-24

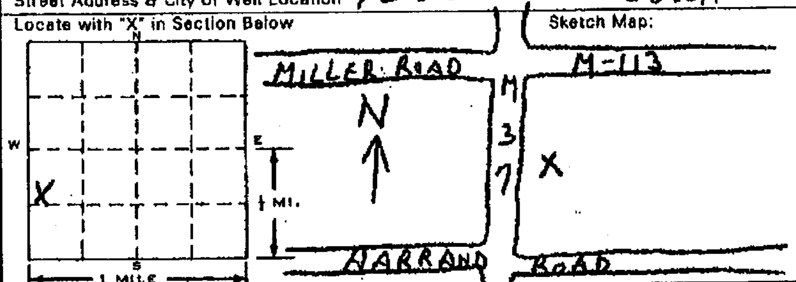
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	SW 1/4 NW 1/4 SW 1/4	9	T.25 N/S	R.11 E/W

Distance And Direction From Road Intersection: BETWEEN M-113 & HARRAND ROAD ON M-37. EAST SIDE OF ROAD.

Street Address & City of Well Location: 7525 M-37 South

Locate with "X" in Section Below — Sketch Map:



3 OWNER OF WELL: RICHARD SELTZ

Address: 7525 M-37 South, [illegible] MICH 49649

Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH: (completed) 153 ft. — Date of Completion: 3-11-85

5 [ ] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ]

6 USE: [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ]

7 CASING: Diameter [X] Steel [X] Threaded [ ] Plastic [ ] Welded

4 in. to 149 ft. depth

___ in. to ___ ft. depth

Grouted Drill Hole Diameter ___ in. to ___ ft. depth; ___ in. to ___ ft. depth

Height: Above/Below Surface 1 ft. Weight 11 lbs./ft. Drive Shoe [X] Yes [ ] No

2

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
SURFACE SOIL	1	1
COARSE SAND & SMALL GRAVEL	30	31
GRAY CLAY	58	89
VERY FINE BROWN SAND	7	96
GRAY CLAY	19	115
BROWN CLAY	15	130
MED COARSE BROWN WTR SD	23	153

USE A 2ND SHEET IF NEEDED

8 SCREEN: [ ] Not Installed

Type S/S JOHNSON Diameter 4" Slot/Gauze 10 Length 4'

Set between 149 ft. and 153 ft.

FITTINGS: [ ] K-Packer [ ] Lead Packer [ ] Bremer Check [ ] Blank above screen ___ ft. Other ___

9 STATIC WATER LEVEL: 46 ft. below land surface [ ] Flow

10 PUMPING LEVEL below land surface: 46 ft. after 2 hrs. pumping at 45 G.P.M.; ___ ft. after ___ hrs. pumping at ___ G.P.M.

11 WELL HEAD COMPLETION: [X] Pitless adapter [X] 12" above grade [ ] Basement offset [ ] Approved pit

12 WELL GROUTED? [ ] No [X] Yes From 1 to 25 ft.

[ ] Neat cement [X] Bentonite [ ] Other ___

No. of bags of cement ___ Additives ___

13 Nearest source of possible contamination Type SEPTIC Distance 60 ft. Direction E

Well disinfected upon completion? [X] Yes [ ] No

14 PUMP: [ ] Not Installed [ ] Pump Installation Only

Manufacturer's name GOULD'S

Model number 10EJ HP 1/2 Volts 230

Length of Drop Pipe 80 ft. capacity 10 G.P.M.

TYPE: [X] Submersible [ ] Jet

PRESSURE TANK: Manufacturer's name WELL X-TROL

Model number 201 Capacity 14 Gallons

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

L & R WELL DRLG INC — 1770
REGISTERED BUSINESS NAME — REGISTRATION NO.

Address RR#1 BOX 78 ELMIRA, MICH 49730

Signed Ron Shryock — Date 4-17-85
AUTHORIZED REPRESENTATIVE

D57d 2/84

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a misdemeanor.

GEOLOGICAL SURVEY COPY

GEOLOGICAL SURVEY NO.

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

PERMIT NU

1. LOCATION OF WELL

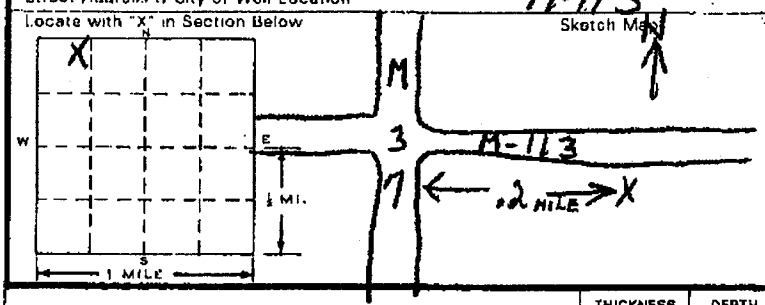
County	Township Name	Fraction	Section Number	Town Number	Range Number
GRAND TRAVERSE	MAYFIELD	NE¼ NW¼ NW¼	9	T. 25 N/S	R. 11 E/W

Distance And Direction From Road Intersection

.2 MILE EAST OF M-37 ON M-113. SOUTH SIDE OF ROAD

Street Address & City of Well Location M-113

Locate with "X" in Section Below



Sketch Map

3 OWNER OF WELL

JACK ZIMMERMAN

Address 1719 APACHE PASS

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH: (completed)

70 ft.

Date of Completion 3-6-84

5

☐ Cable tool ☐ Rotary ☐ Driven ☐ Dug

☐ Hollow rod ☒ Auger ☐ Jetted ☐ _____

6 USE:

☒ Domestic ☐ Type I Public ☐ Type III Public

☐ Irrigation ☐ Type IIa Public ☐ Heat pump

☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING:

Diameter ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded

4 in. to 66 ft. depth

_____ in. to _____ ft. depth

Grouted Drill Hole Diameter

_____ in. to _____ ft. depth

_____ in. to _____ ft. depth

Height Above/Below Surface _____ ft.

Weight 11 lbs./ft.

Drive Shoe ☒ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	12	12
Clay	24	36
wet gravel	36	62
water sand	8	70

USE A 2ND SHEET IF NEEDED

8 SCREEN:

☐ Not Installed

Type Johnson Diameter 4

Slot/Gauge 10 Length 4

Set between 66 ft. and 70 ft.

FITTINGS: ☐ K-Packer ☒ Lead Packer ☐ Bremer Check

☐ Blank above screen _____ ft. Other _____

9 STATIC WATER LEVEL

36 ft. below land surface ☐ Flow

10 PUMPING LEVEL: below land surface

50 ft. after 1 hrs. pumping at 35 G.P.M.

_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION

☒ Pitless adapter ☐ 12" above grade

☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☐ No ☒ Yes From 0 to 36 ft.

☐ Neat cement ☐ Bentonite ☒ Other mud

No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination

Type Septic Distance 60 ft. Direction W

Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP:

☐ Not Installed ☐ Pump Installation Only

Manufacturer's name Hunt & Walling

Model number 5BA8 HP ½ Volts 230

Length of Drop Pipe 50 ft. capacity 10 G.P.M.

TYPE: ☒ Submersible ☐ Jet _____

PRESSURE TANK

Manufacturer's name owa tank 42 gal.

Model number _____ Capacity _____ Gallons

15. Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Hunt Drilling Co. 28-1244

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 6410 Centre Rd. Traverse City Mich.

Signed [signature] Date 3-6-84

AUTHORIZED REPRESENTATIVE

D87d (Rev. 10-80)

GEOLOGICAL SURVEY COPY

ATTACHMENT F

MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA

Regional Geology

Grand Traverse County is located on the Northwest flank of the Michigan Basin as indicated on Figure F-1. The regional dip to the south into the basin is about 30-40 feet per mile. The basin extends into northwest Ohio and northeast Indiana and covers all of the lower peninsula of Michigan. To the West-Northwest is the Wisconsin Dome. To the southeast is the structural axis of the Findlay Arch and to the southwest is the axis of the Kankakee Arch. A generalized East-West geologic cross section is included as Figure F-2. Figure F-3 is a generalized stratigraphic column for the State of Michigan.

Area Geology

A cross section of the geologic structure through the area of interest is presented in Figure F-5. Figure F-4 shows the trace of this cross sections.

The injection zone is the Traverse Limestone of Devonian age from 1750' to 2344'. (Total depth of well 2200') The top confining zone is the Coldwater and Antrim Shales from 781 feet to 1750'. The bottom confining zone is the Bell Shale from 2344 feet to 2448 feet.

The following sample descriptions were prepared by Geologist Warren A. Baumann and Jim Sanborn. - Their info is based on what?

Drift	0 to 781'	Sand & gravel. Sm redish shales.
Coldwater	781' to 1506'	Sh, lt-med grys, frm, sub rnd, sli calc, pyr.
Antrim	1506' to 1750'	Shale, blk to dk brn, frm-britt, sub rnd v. grainy text, fnt yel glo flor.
Trav. Form	1750' to 1816'	Sh, lt grys frm, sub rnd. Smdolic, brn stringers, v. calc. pyr.
Trav. Lime	1816' to 1870'	Ls, lt tan to buff, fxln, mhd, gd, intrxln & micro pore porosity, no vis, stn, cln.
Trav. Lime	1870' to 2100'	Ls, lt-med brns, vfxln, hd dns arg, sm gy shale, stringers, Trs, sue porosity cln, abnt fos.
Trav. Lime	2100' to 2200'	Ls, med gy brn to crmy tans, vfxln, hd dns, arg, sm gd micro, por porosity. intrvl from 2100 - 50. No stn - fos.

The Coldwater shale of the Mississipian System (Paleozoic age) consist primarily of gray and bluish gray shale. The shale is micraceous in some areas and usually contains small amounts of limestone, dolomite, siltstone or sandstone. In the Weber 4-8, the Coldwater Shale was described as being light to medium gray in color, firm and slightly calcareous. The Coldwater is about 725 feet thick at the Weber 4-8 wellsite and is underlain with the Antrim shale.

Below the Coldwater is the Antrim Shale of Devonian age. The Antrim is predominately a dark gray to black and brown, hard, thin-bedded, brittle carbonaceous shale. In the Weber 4-8, the Antrim Shale was described as being black to dark brown, firm, brittle with a very grainy texture. At the Weber 4-8 wellsite the Antrim is about 245 feet thick.

Below the Antrim is the Traverse Group of Devonian age. The Traverse group is generally divided into three units. These units are the Traverse Formation, Traverse Limestone and the Bell Shale. Some consider the Traverse Formation to be a transition zone between the Antrim Shale and Traverse Limestone. This formation generally is composed of Gray shale in the upper portion and graduates to more calcareous shale and limestone near the base. In the Weber 4-8, the Traverse Formation was described as being a light gray firm shale with small brown dolmitic stringers. The Traverse Formation is 60 to 70 feet thick in the vicinity of the Weber 4-8.

The middle unit of the Traverse Group is the Traverse Limestone. In Western Michigan the Traverse Limestone is predominately pure limestone with some beds of dolomite. A series of porosity zones is often present in the upper portion of the Limestone. In the Weber 4-8, the Traverse Limestone was described as being light tan to buff, with intercrystalin and micro porosity and small hard dense shale and sandstone stringers. The Traverse Limestone is over 500 feet thick in the area of the Weber 4-8.

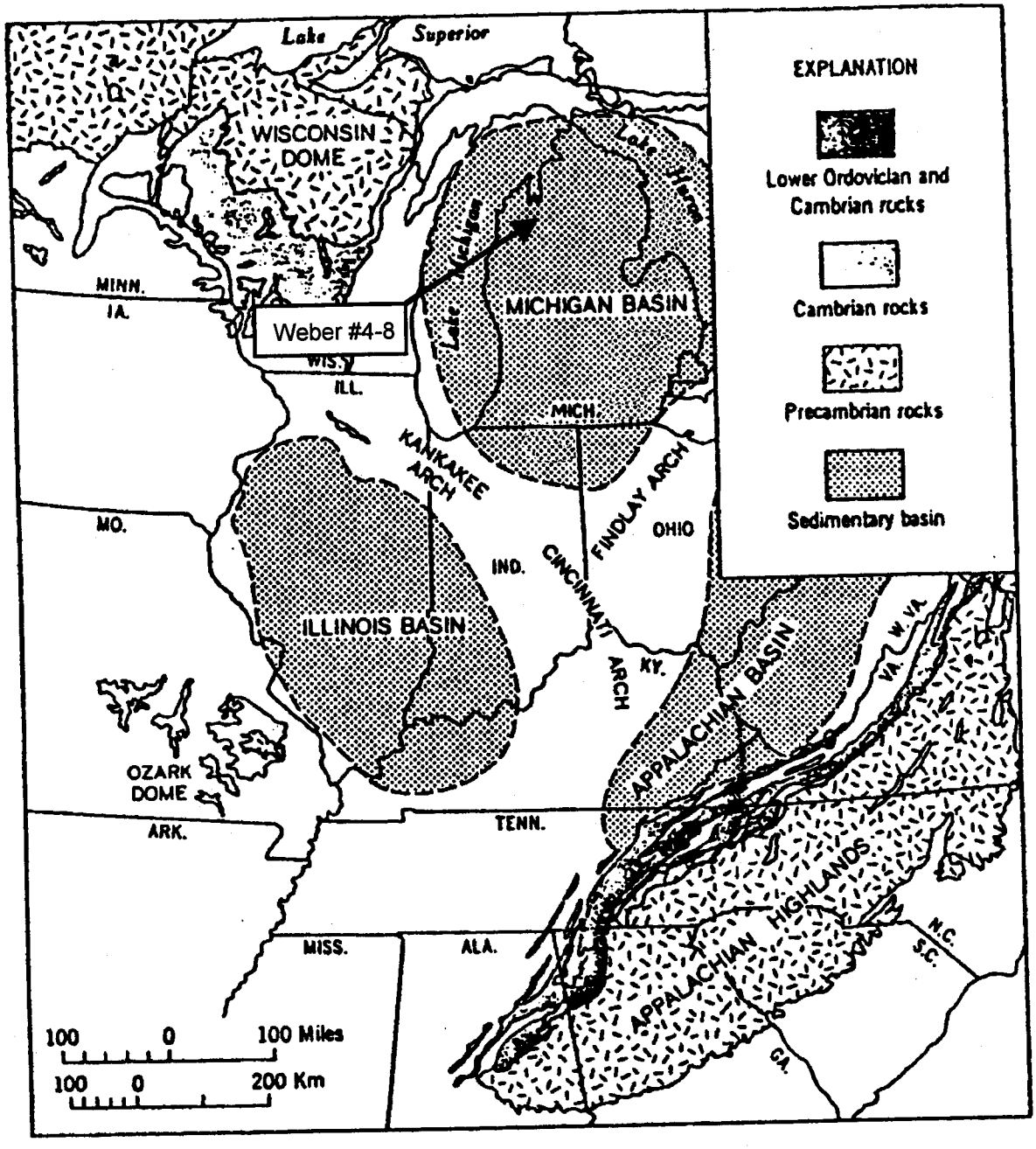
The lowermost formation of the Traverse Group is the Bell Shale. The Bell Shale is a little over 100 feet thick in the area of interest.

Below the Bell Shale is the Dundee Formation of Devonian age. The Dundee is a Limestone predominately buff to brownish in color, and normally fine to coarsely crystalline. The Dundee is 180 to 200 feet thick in the vicinity of the Weber 4-8.

Below the Dundee is the Detroit River Group. The rocks of the Detroit River Group are variously composed dolomite, anhydrite, salt, limestone and sandstone.

FIGURE F-1

MICHIGAN REGIONAL GEOLOGY MAP



From Bulletin 57
Indiana Geological Survey

FIGURE F-2
GENERALIZED EAST-WEST CROSS-SECTION MICHIGAN BASIN

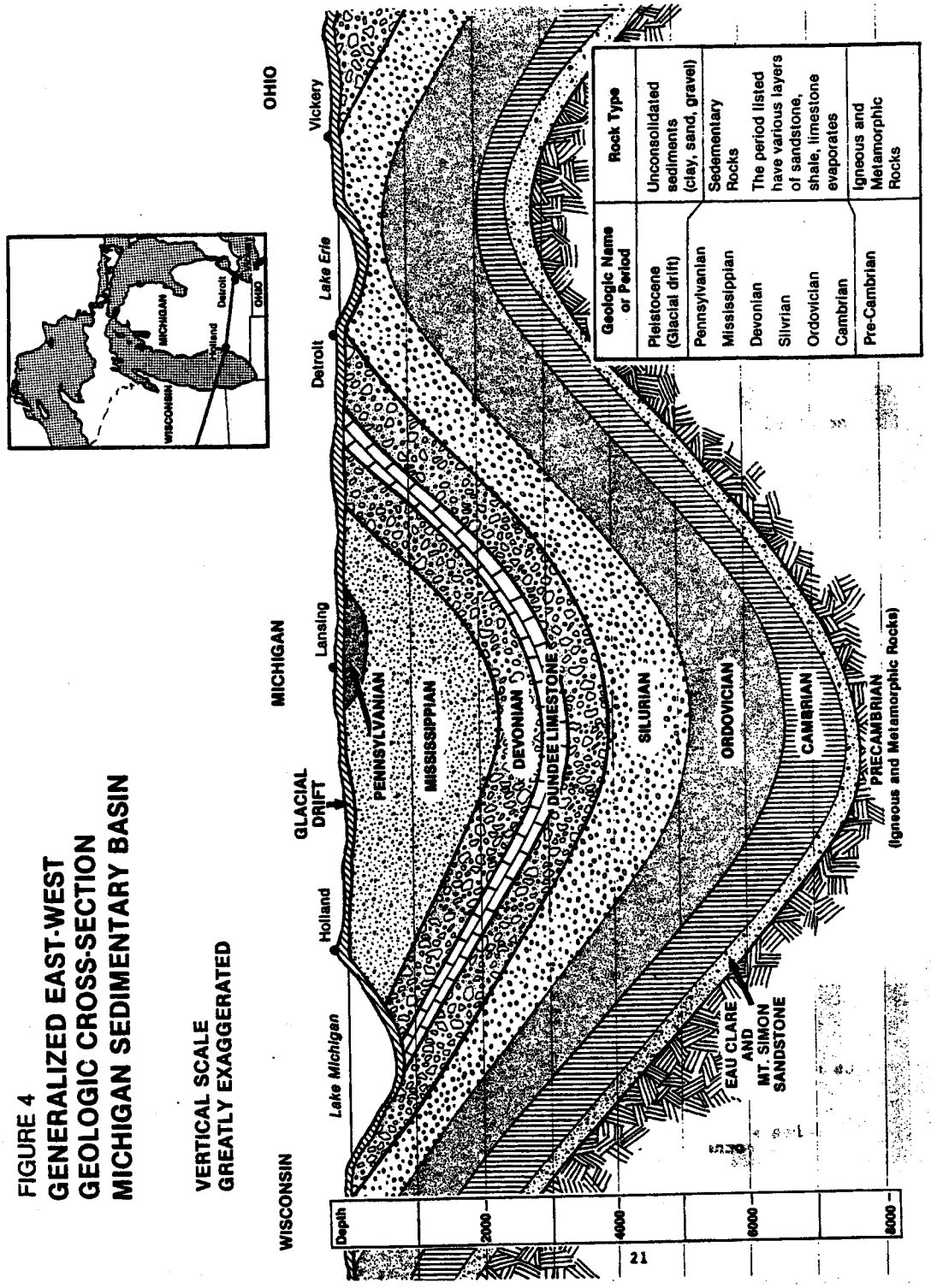
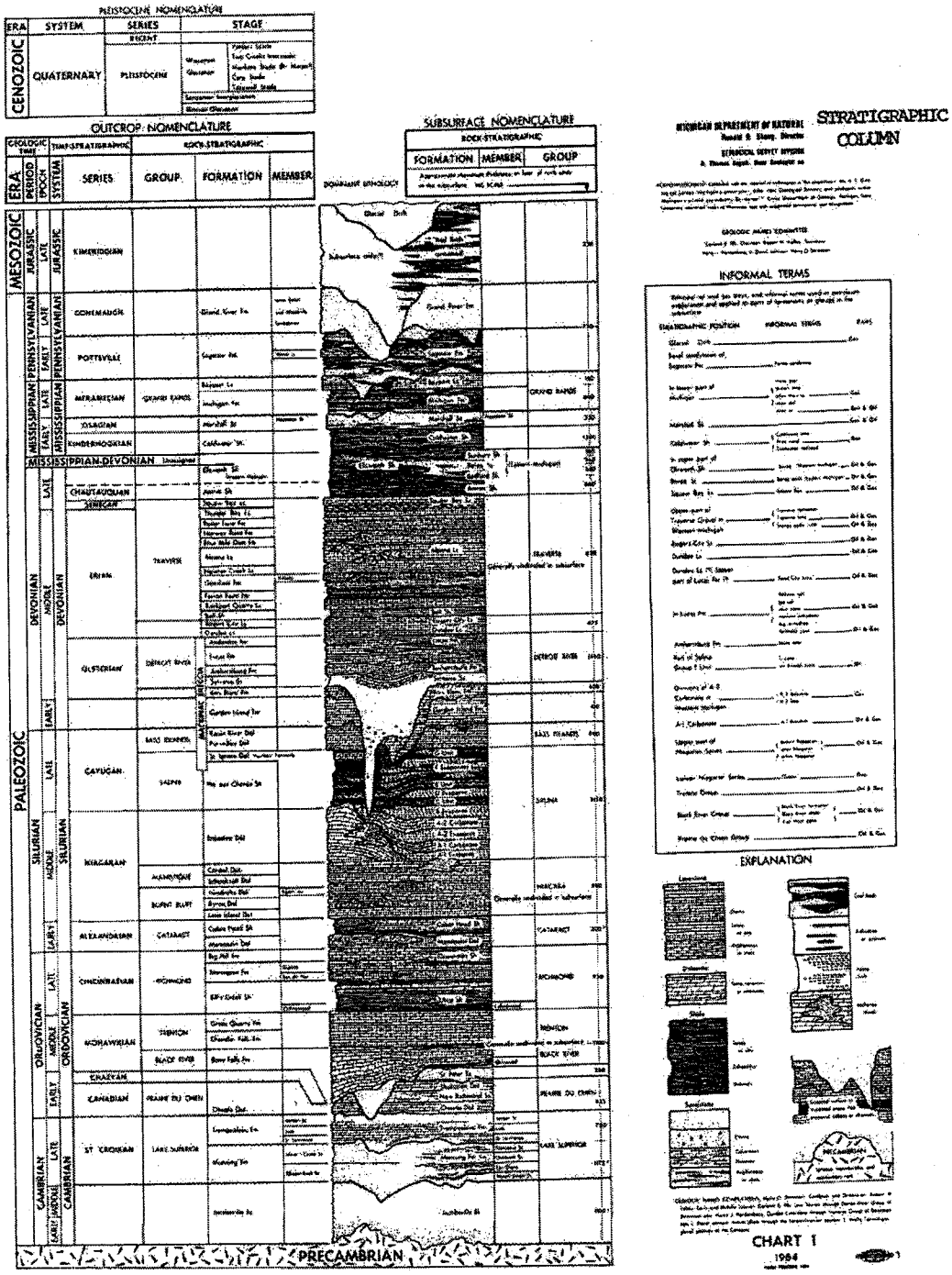


FIGURE 4
GENERALIZED EAST-WEST GEOLOGIC CROSS-SECTION MICHIGAN SEDIMENTARY BASIN

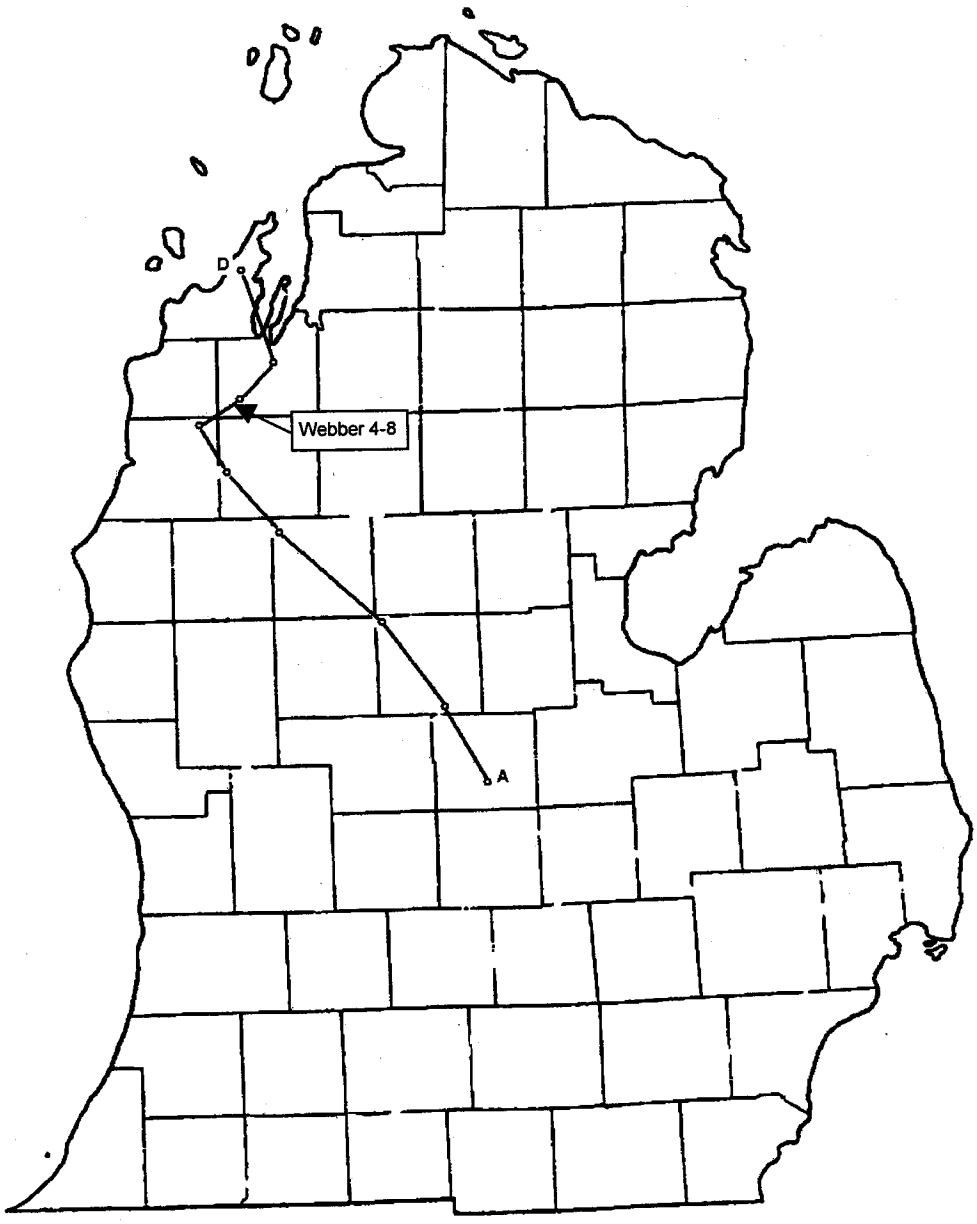
VERTICAL SCALE GREATLY EXAGGERATED

FIGURE F-3
Generalized Michigan Stratigraphic Section



From Bulletin 57
Indiana Geological Survey

Figure F-4



Map of Trace of Cross Section

Figure F-5

CROSS SECTION

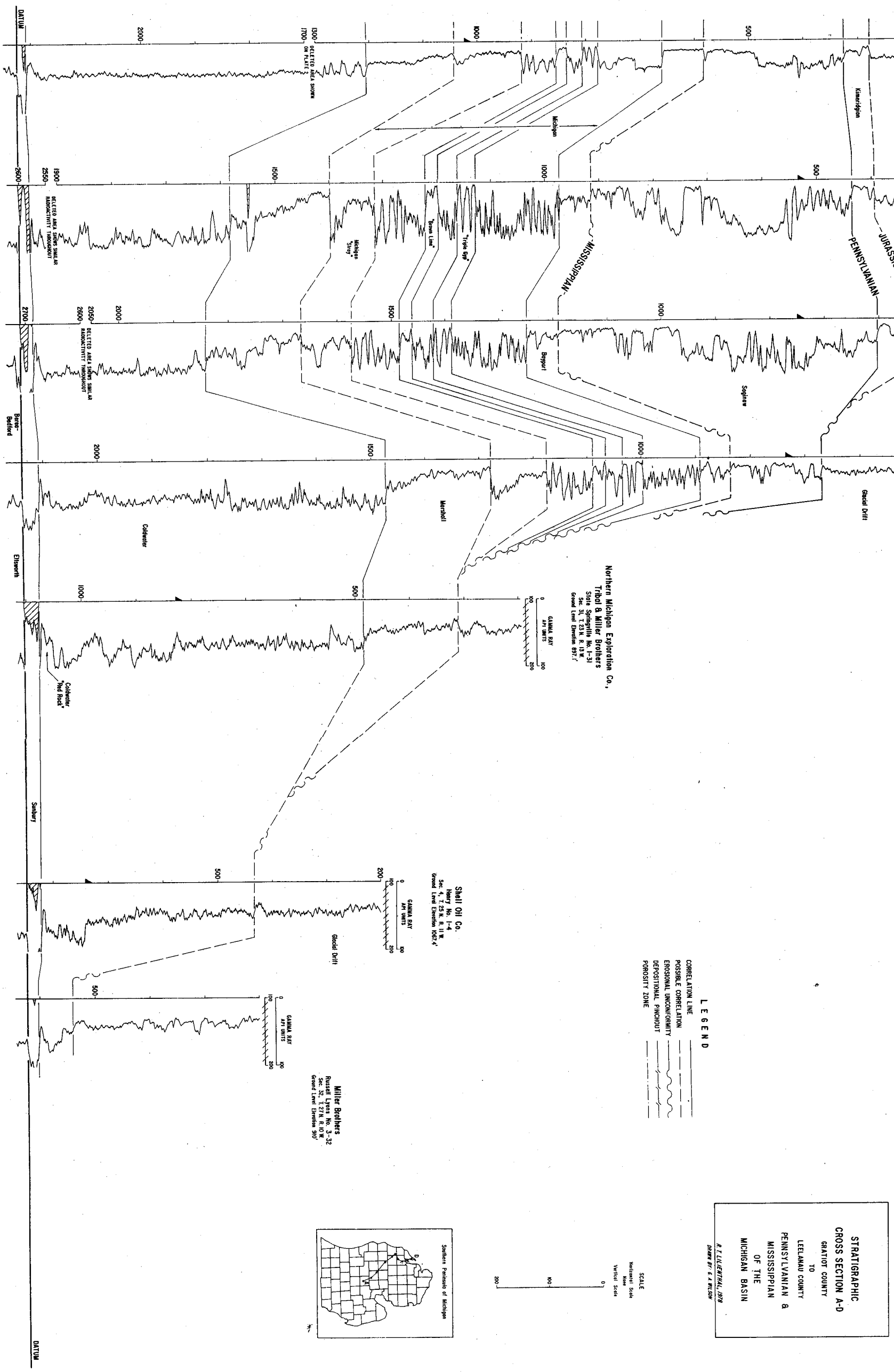
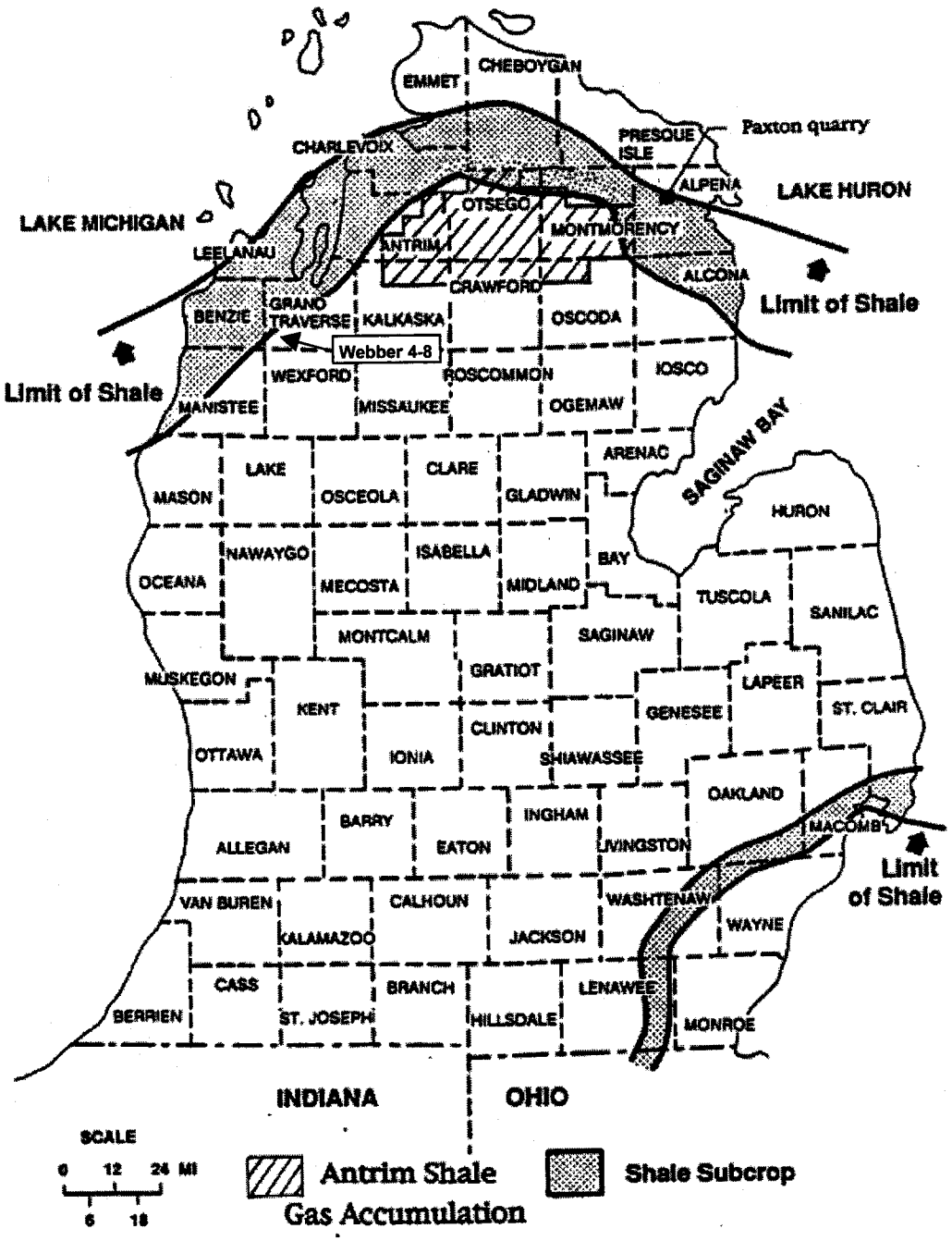
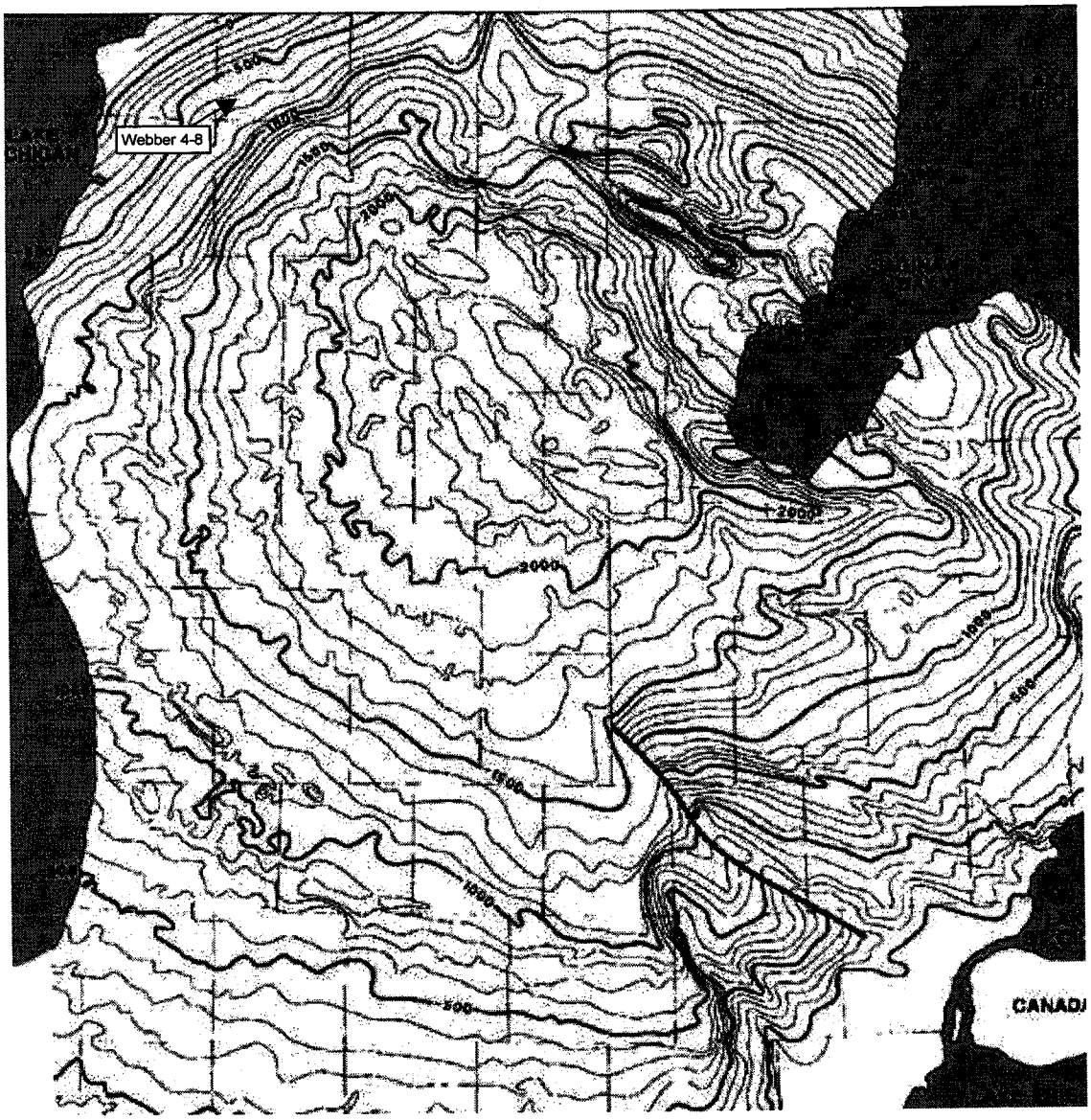


Figure 6



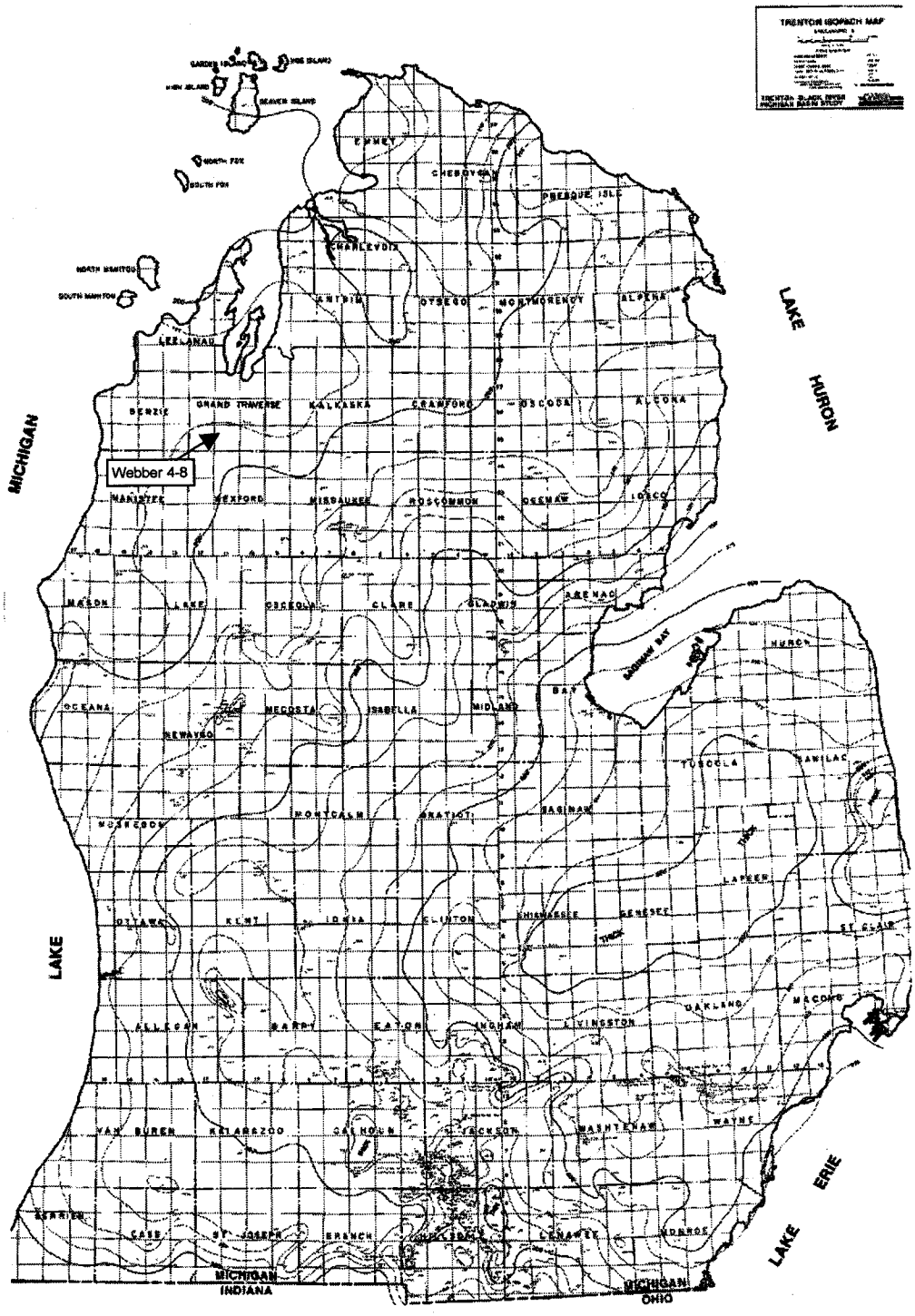
Map Antrim Production

Figure F-7



Structure Map
Top of Trenton

Figure F-8



Isopac Map of Trenton

ATTACHMENT H
OPERATING DATA

This permit application is for the purpose of adding leachate water from the Glen's Sanitary Landfill to the saltwater presently being injected into the Weber #4-8 Saltwater Disposal Well.

The Weber #4-8 was originally drilled in November of 1982 under Michigan Permit #36221. Team Completion L.L.C. submitted a Permit Application to dispose of saltwater from wells owned by other operators in the area and USEPA Permit #MI-055-2D-C034 was issued on April 8, 2003. Approval to start injection into the Weber #4-8 was received on July 23, 2004.

Sodium Chloride/Calcium Chloride brine water produced from the Niagaran is being injected into the Traverse and Traverse Lime Formation between 1791 and 2200 feet. The brine has a specific gravity of from 1.02 to 1.07 (8.5 to 8.9 pounds/gallon). Daily disposal rates are between 29 and 88 gallons per minute (1000 bbl to 3000 bbl per day) with no surface pressure. Typical analysis of the brine water is shown on page H-2.

It is proposed that in addition to the present brine water being injected that leachate from the Glen's Sanitary Landfill at Maple City, Michigan be injected. With the addition of the leachate the anticipate daily injection rates are between 29 and 146 gallons per minute (1000 bbl to 5000 bbl per day). It is expected that the combined waste fluids will be injected at zero surface pressure and no pumps will be required.

Two analysis of the leachate from the Glen's Sanitary Landfill is shown on pages H-3 through H-13. The first sample was collected on August 30, 2006 and the second sampled on May 22, 2007.

ANALYSIS OF INJECTED BRINE WATER

(231) 369-3309
(231) 369-3329
(800) 253-1412
Fax: (231) 369-3331

Midwest

Analytical Laboratories, Inc.
P.O. Box 467
Kalkaska, MI 49646

Company: Team Services
P.O. Box 1104
Kalkaska, MI 49646

Operator: Schmude Oil Co.
Well Name: Townsite 1-17 HD
Permit #: 39888
Location: SE-NE-NE, Sec. 17
T27N-R7W, Kalkaska Twp
Kalkaska County

Project #: na
Location: Townsite 1-17 HD
Sample Date: 06/26/02
Sample of: Water
Submitted Date: 06/26/02
Sample Point: na
Sampled by: Team Services
Analysis Date: 07/09/02
Analysis #: 262602

EPA Method	Cations	mg/L	Detection Limit
273.1	Sodium	47000	0.01 mg/L
258.1	Potassium	16800	0.04 mg/L
215.1	Calcium	78200	0.04 mg/L
242.1	Magnesium	8300	0.01 mg/L
236.1	Iron (Total)	52	1 mg/L
208.1	Barium	7	1 mg/L

EPA Method	Anions	mg/L	Detection Limit
325.3	Chloride	225000	1 mg/L
375.4	Sulfate	83	10 mg/L
310.1 Alkalinity as	Carbonate	nd	1 mg/L
310.1 Alkalinity as	Bicarbonate	62	1 mg/L
376.2	Sulfide	nd	1.0 mg/L
	Total Dissolved Solids	375504	—

		Result	
120.1	Resistivity(Ohm-m)	0.047	@ 25 Deg. C
150.1	pH	4.81	@ 25 Deg. C
—	Specific Gravity	1.256	@ 60 Deg. F(Water=1)

nd=not detected
USEPA Methods for the Chemical Analysis of Water and Wastes, 3rd. Edition

ANALYSIS OF LEACHATE WATER

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N Center Ave
Somerset PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Friday, September 29, 2006

DEBBIE JOHNSTON
GLEN'S SANITARY LANDFILL INC
WASTE MANAGEMENT OF N MICHIGAN
518 E TRAVERSE HIG
MAPLE CITY, MI 49664

TEL:
FAX

RE: GLENS 500 A

Order No.: G0608586

Dear DEBBIE JOHNSTON:

Geochemical Testing received 1 sample(s) on 8/31/2006 for the analyses presented in the following report.

There were no problems with the analyses and all QC data met NELAC, EPA, and laboratory specifications except where noted in the Case Narrative.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

David M. Glessner
Laboratory Manager

Susan K. Gerhard
Project Manager

Report(s) To:
DON CONWAY

MEMBER ACIL

Geochemical Testing

Date: *29-Sep-06*

CLIENT: GLEN'S SANITARY LANDFILL INC
Project: GLENS 500 A
Lab Order: G0608586

CASE NARRATIVE

No problems were encountered during analysis of this work order number, except as noted.

The determinative step for cyanide was subcontracted to STL-Buffalo. A copy of the subcontractor's laboratory report is enclosed with this Analytical Report. This laboratory meets NELAC and EPA laboratory accreditations. The reference method from this lab for total cyanide is EPA 335.2, "Cyanide, total".

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Indicates an estimated value.
U - The analyte was not detected at or above the listed concentration, which is below the laboratory quantitation limit.
B - Analyte detected in the associated Method Blank
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range
* - Value exceeds Action Limit
H - Method Hold Time Exceeded

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *29-Sep-06*

CLIENT: GLEN'S SANITARY LANDFILL INC
Client Sample ID: Tank B
Lab Order: G0608586
Project: GLENS 500 A
Lab ID: G0608586-001
Matrix: LEACHATE
Sampled By: Gosling Czubak, Inc.
Collection Date: 8/30/2006 11:00:00 AM
Received Date: 8/31/2006

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
FIELD PARAMETERS		FLD				Analyst:
pH (Field)	8.32			S.U.	0	8/30/2006 11:00:00 AM
Specific Conductance (Field)	10560			umhos/cm	0	8/30/2006 11:00:00 AM
Temperature (Field)	27.1			deg C	0	8/30/2006 11:00:00 AM
INORGANIC NON-METALS		SM 18 2320B				Analyst: SAG
Alkalinity to pH 4.5	3600	5		mg/L CaCO3	1	9/6/2006 9:55:00 PM
INORGANIC NON METALS		SM4500-CO2D				Analyst: SAG
Bicarbonate	3540	5		mg/L CaCO3	1	9/6/2006 9:55:00 PM
INORGANIC NON-METALS		EPA 325.2				Analyst: BLY
Chloride	1600	20		mg/L	10	9/7/2006 10:19:46 AM
TOTAL CYANIDE		SM 18 4500-CN-C&E				Analyst: SUB
Cyanide, total	0.01	0.01	U	mg/L	1	9/8/2006
INORGANIC NON-METALS		SM4500-CO2D				Analyst: SAG
Carbonate	68	5		mg/L CaCO3	1	9/6/2006 9:55:00 PM
INDICATOR ORGANIC PARAMETERS		HACH 8000				Analyst: AND
Chemical Oxygen Demand	1130	5		mg/L	1	9/5/2006 12:20:00 PM
PHYSICAL TESTS		EPA 120.1				Analyst: SAG
Specific Conductance	9970	1		µmhos/cm	1	9/6/2006 9:55:00 PM
INORGANIC NON-METALS		EPA 350.1D				Analyst: SLY
Ammonia Nitrogen	508	30.0		mg/L as N	200	9/26/2006
INORGANIC NON-METALS		SM4500-B				Analyst: MAP
Nitrite Nitrogen	< 0.05	0.05		mg/L as N	1	9/1/2006 10:15:00 AM
INORGANIC NON-METALS		EPA 353.2				Analyst: SLY
Nitrate Nitrogen	< 0.05	0.05		mg/L as N	1	9/5/2006 1:19:02 PM
PH BY SM 4500 H+B		SM4500-H+B				Analyst: SAG
pH	6.31	0		su	1	9/6/2006 9:55:00 PM
INDICATOR ORGANIC PARAMETERS		EPA 420.1				Analyst: MMR
Phenolics	188	100		µg/L	10	9/18/2006 10:20:00 AM
INORGANIC NON-METALS		EPA 375.4				Analyst: SLY
Sulfate	< 10	10	S	mg/L	1	9/6/2006

NOTES:
S - Outlying spike recovery observed. A duplicate analysis was performed with similar results indicating a matrix effect.

PHYSICAL TESTS		SM2540-C				Analyst: SAG
Total dissolved solids	4810	10		mg/L	1	8/31/2006 7:51:00 PM

ACCREDITED IN ACCORDANCE WITH NELAC
I.D. 58-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *29-Sep-06*

CLIENT: GLEN'S SANITARY LANDFILL INC
Client Sample ID: Tank B
Lab Order: G0608586
Project: GLENS 500 A
Lab ID: G0608586-001
Matrix: LEACHATE

Sampled By: Gosling Czubak, Inc.
Collection Date: 8/30/2006 11:00:00 AM
Received Date: 8/31/2006

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
INORGANIC NON METALS		CALCULATED				Analyst: LAN
Total Inorganic Nitrogen	26.6	0.04		mg/L as N	1	9/5/2006
INORGANIC METALS		EPA 200.7				Analyst: JLH
Barium	0.04	0.01		mg/L	1	9/5/2006 7:00:00 PM
Calcium	47.8	0.1		mg/L	1	9/5/2006 7:00:00 PM
Cobalt	0.019	0.005		mg/L	1	9/5/2006 7:00:00 PM
Iron	2.16	0.05		mg/L	1	9/5/2006 7:00:00 PM
Magnesium	112	0.1		mg/L	1	9/5/2006 7:00:00 PM
Manganese	0.04	0.01		mg/L	1	9/5/2006 7:00:00 PM
Nickel	0.12	0.01		mg/L	1	9/5/2006 7:00:00 PM
Potassium	530	5.0		mg/L	10	9/5/2006 3:40:00 PM
Sodium	1370	2.0		mg/L	10	9/5/2006 3:40:00 PM
Vanadium	0.031	0.005		mg/L	1	9/5/2006 7:00:00 PM
Zinc	0.03	0.01		mg/L	1	9/5/2006 7:00:00 PM
INORGANIC METALS		EPA 200.8				Analyst: NPT
Antimony	< 10	10		µg/L	10	9/12/2006 3:45:00 PM
Arsenic	24.4	10		µg/L	10	9/12/2006 3:45:00 PM
Beryllium	< 10	10		µg/L	10	9/14/2006 3:36:00 PM
Cadmium	< 2.0	2.0		µg/L	10	9/12/2006 3:45:00 PM
Chromium	51.6	20.0		µg/L	10	9/12/2006 3:45:00 PM
Copper	36.0	20.0		µg/L	10	9/19/2006 6:06:00 PM
Lead	< 10	10		µg/L	10	9/12/2006 3:45:00 PM
Selenium	24.3	10		µg/L	10	9/12/2006 3:45:00 PM
Silver	< 5.0	5.0		µg/L	10	9/12/2006 3:45:00 PM
Thallium	< 2.0	2.0		µg/L	10	9/12/2006 3:45:00 PM
VOLATILE ORGANIC COMPOUNDS		EPA 8260B				Analyst: JW
1,1,1,2-Tetrachloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,1,1-Trichloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,1,2,2-Tetrachloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,1,2-Trichloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,1-Dichloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,1-Dichloroethene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,2,3-Trichloropropane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,2-Dibromo-3-chloropropane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
1,2-Dibromoethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,2-Dichlorobenzene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,2-Dichloroethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,2-Dichloropropane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
1,4-Dichlorobenzene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
2-Hexanone	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM

ACCREDITED IN ACCORDANCE WITH THE NELAC
I.D. 68-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *29-Sep-06*

CLIENT: GLEN'S SANITARY LANDFILL INC
Client Sample ID: Tank B
Lab Order: G0608586
Project: GLENS 500 A
Sampled By: Gosling Czubak, Inc.
Lab ID: G0608586-001
Collection Date: 8/30/2006 11:00:00 AM
Matrix: LEACHATE
Received Date: 8/31/2006

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		**EPA 8260B**				Analyst: JW
4-Methyl-2-Pentanone	1.9	1.0		µg/L	1	9/2/2006 5:51:00 AM
Acetone	57.1	25.0		µg/L	1	9/2/2006 5:51:00 AM
Acrylonitrile	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Benzene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Bromochloromethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Bromomethane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Carbon Disulfide	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Carbon Tetrachloride	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Chlorobenzene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Chlorodibromomethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Chloroethane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Chloromethane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
cis-1,2-Dichloroethene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
cis-1,3-Dichloropropene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Dibromomethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Dichlorobromomethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Ethylbenzene	2.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Iodomethane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Methyl Ethyl Ketone	17.6	5.0		µg/L	1	9/2/2006 5:51:00 AM
Methylene Chloride	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Styrene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Tetrachloroethene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Toluene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
trans-1,2-Dichloroethene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
trans-1,3-Dichloropropene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
trans-1,4-Dichloro-2-butene	< 2.0	2.0		µg/L	1	9/2/2006 5:51:00 AM
Tribromomethane	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Trichloroethene	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Trichlorofluoromethane	< 5.0	5.0		µg/L	1	9/2/2006 5:51:00 AM
Trichloromethane	5.7	1.0		µg/L	1	9/2/2006 5:51:00 AM
Vinyl Acetate	< 1.0	1.0		µg/L	1	9/2/2006 5:51:00 AM
Vinyl Chloride	< 2.0	2.0		µg/L	1	9/2/2006 5:51:00 AM
Total Xylene	4.8	3.0		µg/L	1	9/2/2006 5:51:00 AM
Surr: 1,2-Dichloroethane-d4	113	70-130		%REC	1	9/2/2006 5:51:00 AM
Surr: 4-Bromofluorobenzene	110	70-130		%REC	1	9/2/2006 5:51:00 AM
Surr: Dibromofluoromethane	105	70-130		%REC	1	9/2/2006 5:51:00 AM
Surr: Toluene-d8	99.9	70-130		%REC	1	9/2/2006 5:51:00 AM
INDICATOR ORGANIC PARAMETERS		**SM 18 5310-C**				Analyst: JDH
Total Organic Carbon	304	0.5		mg/L	100	9/6/2006 5:31:00 PM

I.D. 56-00306 PA DEP

GEOCHEMICAL TESTING
Environmental and Energy Analysis

2005 N Center Ave
Somerset PA 15501

814/443-1671
814/445-6666
FAX: 814/445-6729

Monday, June 25, 2007

DEBORA JOHNSTON
GLEN'S SANITARY LANDFILL INC
WASTE MANAGEMENT OF N MICHIGAN
518 E TRAVERSE HIG
MAPLE CITY, MI 49664

TEL:
FAX

RE: Glen's Sanitary Landfill 500A

Order No.: G0705558

Dear DEBORA JOHNSTON:

Geochemical Testing received 1 sample(s) on 5/23/2007 for the analyses presented in the following report.

There were no problems with the analyses and all QC data met NELAC, EPA, and laboratory specifications except where noted in the Case Narrative.

If you have any questions regarding these tests results, please feel free to call.

Sincerely,

David M. Glessner
Laboratory Manager

Susan K. Gerhard
Project Manager

Report(s) To:
DON CONWAY

MEMBER

Geochemical Testing

Date: 25-Jun-07

CLIENT: GLEN'S SANITARY LANDFILL INC
Project: Glen's Sanitary Landfill 500A
Lab Order: G0705558

CASE NARRATIVE

No problems were encountered during analysis of this work order number, except as noted.

Field parameter data was measured or analyzed by the sampler. The Chain-of-Custody or ancillary forms that record results provided by the sampler are enclosed with the Analytical Reports.

2-Methynaphthalene by Method 8260 is qualified with a "J" on all samples reported in this Lab Order, which signifies that there is increased uncertainty and that all results are estimates. The laboratory was unable to calibrate for this semi volatile compound at the Michigan Target Detection Limit of 5 ug/L. This compound's poor purging efficiency is the suspected cause and the reason that this compound is not specified in Method 8260.

Laboratory Results

Geochemical Testing

Date: 25-Jun-07

CLIENT: GLEN'S SANITARY LANDFILL INC
Lab Order: G0705558
Project: Glen's Sanitary Landfill 500A
Lab ID: G0705558-001
Matrix: LEACHATE

Client Sample ID: Tank B
Sampled By: Gosling Czubak, Inc.
Collection Date: 5/22/2007 3:00:00 PM
Received Date: 5/23/2007

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
FIELD PARAMETERS		FIELD				Analyst:
pH (Field)	8.37			S.U.	0	5/22/2007 3:00:00 PM
Specific Conductance (Field)	7470			umhos/cm	0	5/22/2007 3:00:00 PM
Temperature (Field)	19.6			deg C	0	5/22/2007 3:00:00 PM
INORGANIC NON-METALS		SM 2320B				Analyst: KMR
Alkalinity to pH 4.5	2530	5		mg/L CaCO3	1	5/24/2007 2:47:00 PM
INORGANIC NON METALS		SM 4500-CO2D				Analyst: KMR
Bicarbonate	2480	5		mg/L CaCO3	1	5/24/2007
TOTAL CYANIDE		SM 4500-CN-E				Analyst: SLY
Cyanide, total	< 0.020	0.020		mg/L	1	6/30/2007
INORGANIC NON-METALS		SM 4500-CO2				Analyst: KMR
Carbonate	44	5		mg/L CaCO3	1	5/24/2007
INDICATOR ORGANIC PARAMETERS		HACH 8000				Analyst: SAG
Chemical Oxygen Demand	< 10	10		mg/L	1	5/23/2007
INORGANIC NON-METALS		EPA 300.0				Analyst: AND
Nitrate Nitrogen	0.02	0.02	U	mg/L as N	1	5/23/2007 5:31:00 PM
Nitrite Nitrogen	0.02	0.02	U	mg/L as N	1	5/23/2007 5:31:00 PM
INORGANIC NON-METALS		EPA 300.0				Analyst: AND
Chloride	1110	1		mg/L	1	5/23/2007 5:31:00 PM
Sulfate	19	2		mg/L	1	5/23/2007 5:31:00 PM
INORGANIC NON-METALS		EPA 350.1				Analyst: JPL
Ammonia Nitrogen	370	0.04		mg/L as N	100	5/23/2007 11:39:35 PM
INDICATOR ORGANIC PARAMETERS		EPA 420.1				Analyst: MMR
Phenolics	< 50.0	50.0		µg/L	5	5/24/2007 10:10:00 AM
INORGANIC NON-METALS		SM 2540 C				Analyst: KLS
Total dissolved solids	3320	50		mg/L	5	5/23/2007 10:03:00 AM
INORGANIC NON METALS		CALCULATED				Analyst: SKG
Total Inorganic Nitrogen	370	0.04		mg/L as N	1	5/23/2007
INORGANIC METALS		EPA 200.7				Analyst: GMG
Barium	0.049	0.005		mg/L	1	5/25/2007 6:28:00 PM
Cobalt	0.015	0.015		mg/L	1	5/25/2007 6:28:00 PM
Iron	1.5	0.02		mg/L	1	5/25/2007 6:28:00 PM
Magnesium	52	1.0		mg/L	1	5/25/2007 6:28:00 PM
Manganese	0.083	0.005		mg/L	1	5/25/2007 6:28:00 PM
Potassium	300	0.2		mg/L	1	5/25/2007 6:28:00 PM

I.D. 58-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *25-Jun-07*

CLIENT: GLEN'S SANITARY LANDFILL INC
Client Sample ID: Tank B
Lab Order: G0705558
Project: Glen's Sanitary Landfill 500A
Lab ID: G0705558-001
Matrix: LEACHATE
Sampled By: Gosling Czubak, Inc.
Collection Date: 5/22/2007 3:00:00 PM
Received Date: 5/23/2007

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
INORGANIC METALS		EPA 200.7				Analyst: GMG
Sodium	939	1		mg/L	10	5/29/2007 3:18:00 PM
Vanadium	0.022	0.002		mg/L	1	5/29/2007 6:28:00 PM
Zinc	0.03	0.01		mg/L	1	5/29/2007 6:28:00 PM
INORGANIC METALS		EPA 200.8				Analyst: NPT
Antimony	2	1		µg/L	1	5/29/2007 4:31:00 PM
Arsenic	12	1		µg/L	1	5/29/2007 4:31:00 PM
Beryllium	< 1	1		µg/L	1	5/30/2007 1:34:00 PM
Cadmium	< 0.2	0.2		µg/L	1	5/29/2007 4:31:00 PM
Chromium	32	1		µg/L	1	5/29/2007 4:31:00 PM
Copper	13	1		µg/L	1	5/29/2007 4:31:00 PM
Lead	1	1		µg/L	1	5/29/2007 4:31:00 PM
Nickel	57	2		µg/L	1	5/29/2007 4:31:00 PM
Selenium	6	1		µg/L	1	5/29/2007 4:31:00 PM
Silver	0.2	0.2	U	µg/L	1	5/30/2007 1:34:00 PM
Thallium	< 2	2		µg/L	1	5/29/2007 4:31:00 PM
VOLATILE ORGANIC COMPOUNDS		EPA 8260				Analyst: JAW
1,1,1,2-Tetrachloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,1,1-Trichloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,1,2,2-Tetrachloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,1,2-Trichloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,1-Dichloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,1-Dichloroethene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2,3-Trichloropropane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2,4-Trichlorobenzene	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
1,2,4-Trimethylbenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2-Dibromo-3-chloropropane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
1,2-Dibromoethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2-Dichlorobenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2-Dichloroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,2-Dichloropropane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,3,5-Trimethylbenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,3-Dichlorobenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
1,4-Dichlorobenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
2-Hexanone	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
2-Methylnaphthalene	< 5 J	5.0		µg/L	1	5/26/2007 2:24:00 AM
4-Methyl-2-Pentanone	24.5	5.0		µg/L	1	5/26/2007 2:24:00 AM
Acetone	< 20.0	20.0		µg/L	1	5/26/2007 2:24:00 AM
Acrylonitrile	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Benzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM

I.D. 56-00306 PA DEP

Laboratory Results

Geochemical Testing

Date: *25-Jun-07*

CLIENT: GLEN'S SANITARY LANDFILL INC
Client Sample ID: Tank B

Lab Order: G0705558
Project: Glen's Sanitary Landfill 500A
Lab ID: G0705558-001
Matrix: LEACHATE

Sampled By: Gosling Czubak, Inc.
Collection Date: 5/22/2007 3:00:00 PM
Received Date: 5/23/2007

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS		EPA 8260				Analyst: JAW
Bromochloromethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Bromomethane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Carbon Disulfide	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Carbon Tetrachloride	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Chlorobenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Chlorodibromomethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Chloroethane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Chloromethane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
cis-1,2-Dichloroethene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
cis-1,3-Dichloropropene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Dibromomethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Dichlorobromomethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Dichlorodifluoromethane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Diethyl Ether	12.9	10		µg/L	1	5/26/2007 2:24:00 AM
Ethylbenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Hexachloroethane	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Iodomethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Isopropylbenzene	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Methyl Ethyl Ketone	17.1	5.0		µg/L	1	5/26/2007 2:24:00 AM
Methylene Chloride	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Methyl-tert-butyl ether	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Naphthalene	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
n-Propylbenzene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Styrene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Tetrachloroethene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Toluene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
trans-1,2-Dichloroethene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
trans-1,3-Dichloropropene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
trans-1,4-Dichloro-2-butene	< 5.0	5.0		µg/L	1	5/26/2007 2:24:00 AM
Tribromomethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Trichloroethene	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Trichlorofluoromethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Trichlorotrifluoroethane	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Vinyl Chloride	< 1.0	1.0		µg/L	1	5/26/2007 2:24:00 AM
Total Xylene	< 2.0	2.0		µg/L	1	5/26/2007 2:24:00 AM
Surr: 1,2-Dichloroethane-d4	112	70-130		%REC	1	5/26/2007 2:24:00 AM
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	5/26/2007 2:24:00 AM
Surr: Dibromofluoromethane	106	70-130		%REC	1	5/26/2007 2:24:00 AM
Surr: Toluene-d8	101	70-130		%REC	1	5/26/2007 2:24:00 AM
INDICATOR ORGANIC PARAMETERS		SM 19 6310-C				Analyst: JDH

I.D. 66-00305 PA DEP

Laboratory Results

Geochemical Testing

Date: *25-Jun-07*

CLIENT:	GLEN'S SANITARY LANDFILL INC	**Client Sample ID:** Tank B	
Lab Order:	G0705558		
Project:	Glen's Sanitary Landfill 500A	**Sampled By:** Gosling Czubak, Inc.	
Lab ID:	G0705558-001	**Collection Date:** 5/22/2007 3:00:00 PM	
Matrix:	LEACHATE	**Received Date:** 5/23/2007	

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
INDICATOR ORGANIC PARAMETERS		**SM 19 5310-C**				**Analyst: JDH**
Total Organic Carbon	223	50.0		mg/L	100	5/30/2007 6:07:00 PM

I.D. 56-00306 PA DEP

ATTACHMENT I
FORMATION TESTING

An injection test of the Weber #4-8 on November 9, 1982 showed the well was capable of accepting at least 42 GPM (61 BPH) on vacuum.

Present injection rates are 1000 bbl to 3000 bbl per day with no surface pressure. Since it is expected that the combined waste fluids will be injected at zero surface pressure and no injection pumps are planned, no fracture determination tests are planned.

The calculated maximum pressure gradient at the bottom of the 5 1/2" casing was calculated as follows:

5 1/2" casing seat = 1791'
Max. S.G. of Inj. Fluid = 1.07

Max. Pressure At Casing seat:
1791 x .433 x 1.07 = 829.7 PSI

Max. Pressure Gradient at Casing seat:
829.7/1791 = 0.463 PSI/Ft.

0.8 - [0.433(1.35#)] 1750 - 14.7

?) This is based on what?

[0.8-(0.433(1.256 +0.05 #))] #1791 - 14.7

1.3

~~1774~~ psig

362.34

[0.1163-(0.433(1.35 / 1.256))]

ATTACHMENT J
WELL STIMULATION

To remove fines introduced during the drilling operation and to clean up the injection interval, the Weber #4-8 was treated with acid on November 07, 1982. Approximately 1000 gallons of 28% Hydrochloric acid was distributed across the Traverse Limestone injection interval. The interval treated was between 1791 and 2200 feet.

Occasional stimulations with Hydrochloric acid are anticipated through out the life of the well. Treatment will more than likely be approximately 1000 gallons of 28% Hydrochloric acid.

ATTACHMENT K

INJECTION PROCEDURES

The surface facility will consist of a concrete unloading ramp, piping header, storage tanks, basket strainer, well annulus pressure maintenance system, security fence and containment dikes. Brine water and leachate will be off loaded from the trucks into one of the storage tank and then gravity fed to the disposal well. (See Figure K-1)

Description of surface facility:

Unloading Ramp:
Concrete Pad- Approx. 20' by 80' with 6" containment curb

Storage Tanks:
6 to 8 - 400 BBL (16,800 Gal.) steel storage tanks

Filtration/Treatment:
Basket strainer - No other treatment or filtration is planned

Pumps:
None - Well takes fluid on a vacuum

Well annulus pressure maintenance system: (See Figure K-2)
Pressurized tank with pressure relief valve
Nitrogen supply
Necessary piping, valves and pressure regulator

Instrumentation:
Pressure/vacuum gauge on injection line
Pressure gauge on annulus system
Flow measuring device on injection line
Sight glass on pressurized annulus tank

Pollution Control:
Concrete Pad with curb for truck unloading
Containment dike around storage tanks
800 gal. concrete collection sump W/ pump

Safety/Security
6' high chain link fence w/ 3 strands barbed wire
Pole mounted light

Figure K-1

PLAN OF SURFACE FACILITIES
Weber #4-8

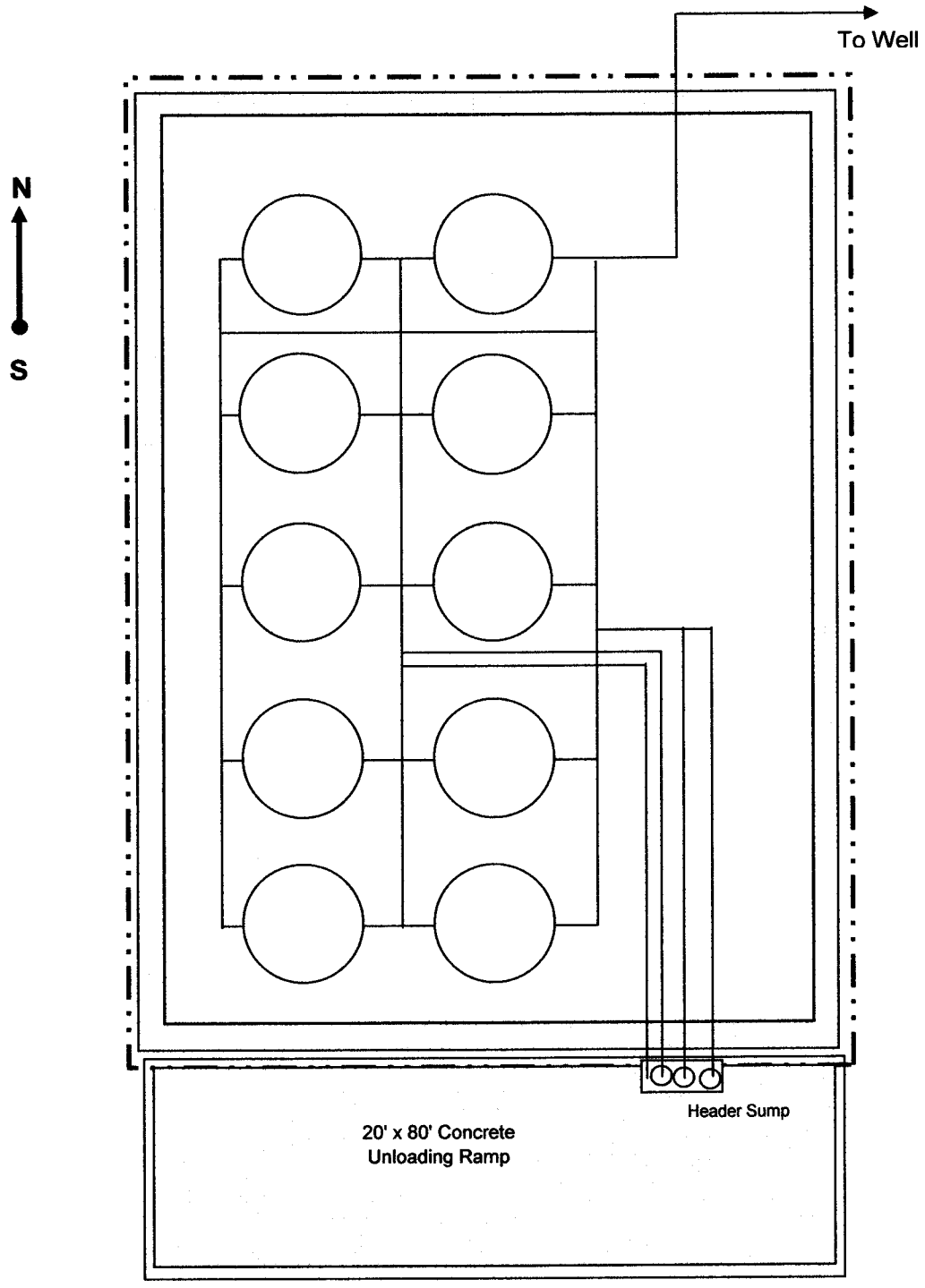
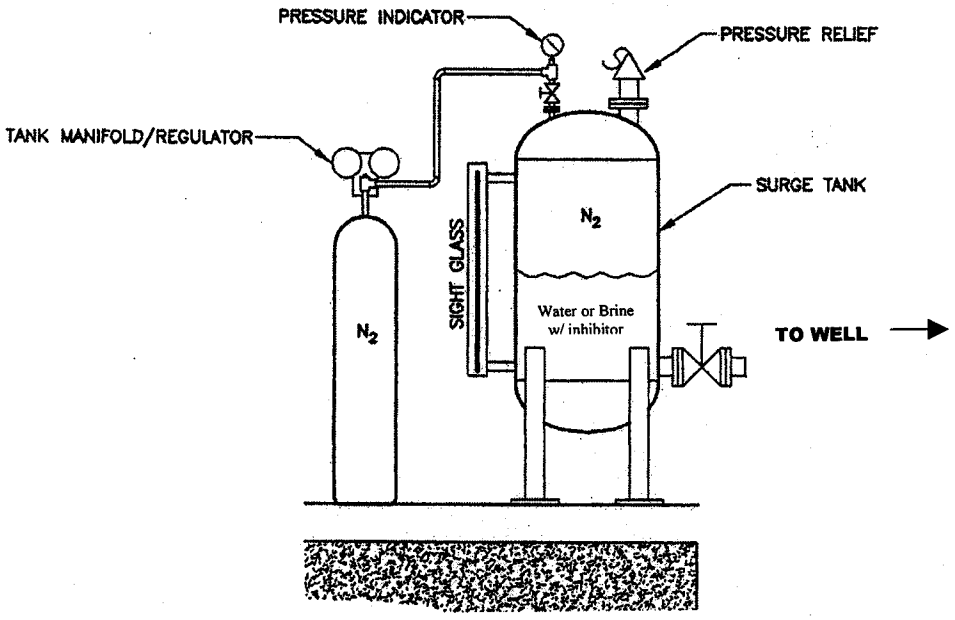


Figure K-2

PROPOSED ANNULUS
PRESSURE MAINTENANCE SYSTEM



ATTACHMENT L
CONSTRUCTION PROCEDURES

The Weber #4-8 was originally drilled as a saltwater disposal well in November 1982. After drilling a 12 1/4" hole, 8 5/8" casing was set at 911 feet. The casing was cemented to surface with 450 sacks of cement. A 7 7/8" hole was then drilled to the total depth of 2200' and 5 1/2" casing set at 1791'. The 5 1/2" casing was cemented to surface with 305 sacks of cement. Salt water was circulated to clean out the well, and a packer run on 2 7/8" tubing and set at 1750'. Bear Lake Disposal operated the well until it was acquired by Team Completions.

A copy of the original drilling and completion report is on pages L-2 and L-3. Page L-4 is a copy of Michigan's Form 7210, "Log of Oil, Gas, Disposal or Storage Well" dated November 9, 1982. Page L-5 contains the Formation Record prepared by Geologists Warren A. Baumann and Jim Sanborn.

Weber #4-8 - ORIGINAL DRILLING REPORT

Well Name: WEBER #4-8 SWD
Permit No: 36221
Mayfield Township, Grand Traverse County
Surf LOG: Sec. 8, T25N-R11W, SW NE NE, 1115'FNL & 1209'FEL
Spudded: 1:30 AM., 11-03-82
Completion: 11-08-82
DTD: 2200'TD. (no logs run)
Elevations: KB 1120.6' RF 1119.1' GL 1105.1'
Contractor: Reef Drilling Corporation, Rig #1
Status: SI (11-09-82)

Casing: 8 5/8" csg @ 911' w/450 sxs cmt.
5 ½" csg @ 1791' w/305 sxs cmt.

Logs Run: None
Dev Surveys: 3/4° @ 2200'

11-02-82 Status - MI & RU. Cellar - 5'

11-03-82 Depth - 400', status - wo water, footage cut - 400', rate - 1/2 mpf, wt - 9.1, vis - 55, run no - 1, size-make - 12 ¼"HTC, OSC3AJ, wob - 35 to 40,000 Ibs, rs - 90 rpms, pp - 400 psi. Started losing fluid @ 200'±.

11-04-82 Depth - 1100', status - drlg, footage cut - 700', rate - 1 1/2 mpf, wt -8.5, vis - 31, run no - 1, size-make - 12 ¼" HTC, OSC3AJ, wob - 45,000 lbs, rs - 90 rpms, pp - 600 psi, Run no - 2 RR, size-make - 7 7/8" Reed TC, FP21J, wob - 25,000 Ibs, rs - 90 rpms, pp - 700 psi. Casing Detail: Ran 22 jts of 8 5/8", 24# used csg totaling 918.72'. Set shoe @ 911'. Dowell cmt'd w/250 sxs Filler, 50-50 poz, 6% gel, 3% CaC12 followed by 200 sxs Class A w/3% CaC12. Displaced w/54 bbls fr wa. SI @ 6:00 PM., 11-03-82. Circ'd 40 bbls of cmt to surf. Recip'd pipe while cementing. Sample Tops BOD - 791'.

11-05-82 Depth - 2000', status - drlg w/bit #3, footage cut - 900', rate - 1 mpf, wt - 8.8, vis - 30, run no - 2 RR, size-make - 7 7/8" RTC, FP21J, wob -25,000 lbs, rs - 70 rpms, pp - 700 psi, Run no - 3 RR, size-make -7 7/8" STC, F-4, wob - 40,000 lbs, rs - 70 rpms, pp - 1000 psi.

11-06-82 Depth - 2200'TD., status - circ @ TD w/salt water, footage cut - 200', wt - 8.8, vis - 30, dev - 3/4° @ 2200', run no - 3 RR, size-make -7 7/8" STC, F-4, wob - 40,000 lbs, rs -

70 rpms, pp - 1000 psi. Csg Detail: Ran 42 jts of 5 1/2", 15.5#, used K-55, ST&C csg totaling 1794.68'. Set Howco pkr shoe @ 1791'.' Howco cmt'd w/130 sxs 50-50 poz, 6% gel, 3% CaC12 followed by 175 sxs Class A w/3% CaC12. Displaced w/43 BFW. Bumped plug w/1000 psi. Float held OK. CIP @ 9:00 PM., 11-05-82. Circ'd 2 bbls cmt to surf.

11-07-82 Depth - 2200' TD. Status - WO location. Circ'd hole w/10.8 ppg salt water. TIH w/pkr on 55 jts of used 2 7/8" tbg. Set pkr @ 1750' (pkr type - 5 1/2" X 2 3/8" Shure Set tension), w/18,000# over string wt. NU 2 7/8" tbg head. Tested csg/tbg annulus to 300 psi, held OK. Established injection rate. Pumped 10.8 ppg salt water @ rates of 1 1/2 to 5 BPM w/pressures of 300 to 1200 psi prior to acidizing. RU Howco & treated open hole from 1791' - 2200* w/1000 gals 28% HC1 acid. Flushed w/35 bbls 10.8 ppg brine @ 3.5 bpm + 500 - 800 psi. Max/Min rate = 1.75/1.5 bpm. Max/Min press = 1000/700 psi. ISIP = vacuum. Had 300 psi break @ 1 3/4 bpm when acid hit formation. After acid job, formation took 10.8 brine on a vacuum, estimated rate @ 2 BPM±. Put reserve pit of 8.8 ppg brine away @ 3 1/2 bpm w/200 psi. Went on a vacuum when done. Did not pump all of reserve pit, just water from top. Released rig @ 11:00 PM. 11-06-82.

11-08-82 HU temporary 2 7/8" surface line from the Weber #3-8C brine load out to disposal well. Started injection test at 12:30 PM. Rates on vacuum as follows:

HOUR	BBLS	BPH	REMARKS
0			
.25	10	40	
.50	23	92	
.75	17	68	
1.00	20	80	
1.25	15	60	
1.75	35	70	
2.00	9	36	
			Switched Tanks
3.25	95	76	Added 13 BW (producing tank)
4.50	50	40	Added 13 BW (producing tank)

SI test @ 4:30 Pm. In 4 1/2 hrs, injected a total of 24 bbls of 10.8 ppg brine on a vacuum. Avg rate for test = 61 bph.

MICHIGAN FORM 7210 DATED 11-09-82

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
LOG OF OIL, GAS, DISPOSAL OR STORAGE WELL (ACT 61)
Submit in DUPLICATE Within 30 Days after Well Completion

PERMIT NUMBER	36221
DEEPENING PERMIT NUMBER	

NAME(S) & ADDRESS OF OWNER(S) SHOWN ON PERMIT	NAME & ADDRESS OF DRILLING CONTRACTOR(S)
Reef Petroleum Corporation P.O. Box 148 Traverse City, MI 49685-0148	Reef Drilling Corporation P.O. Box 552 Mt. Pleasant, MI 48858

LEASE NAME(S) & WELL NUMBER SHOWN ON PERMIT	DIRECTIONALLY DRILLED
Weber #4-8	YES ☐ NO ☒

SURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME
SW NE NE	8	25N	11W	Mayfield

FOOTAGES (North/South) (East/West) — COUNTY NAME: Grand Traverse
1115 Ft. from North Line and 1209 Ft. from East Line of quarter section

SUBSURFACE LOCATION	SECTION	TOWNSHIP	RANGE	TOWNSHIP NAME

FOOTAGES (North/South) (East/West) — COUNTY NAME:
____ Ft. from ____ Line and ____ Ft. from ____ Line of quarter section

DATE	DRILLING BEGUN	TOTAL DEPTH OF WELL	TYPE WELL	ELEVATIONS	
	11-03-82	Driller 2200' Log -	Brine Disposal		
	DRILLING COMPLETED	FORMATION AT T.D.	FT. DRLD. – ROTARY TOOLS	K.B.	R.F.
	11-06-82	Traverse Lime	From Surf To 2200'	1120.6'	1119.1'
	WELL COMPLETED	PRODUCING FORMATION(S)	FT. DRLD. – CABLE TOOLS	R.T.	Grd.
	11-08-82	Traverse Lime	From - To -	-	1105.1'

CASING, CASING LINERS AND CEMENTING

SIZE	WHERE SET	CEMENT	Ft. Pulled
8 5/8"	911'	450 sxs	None
5½"	1791'	305 sxs	None

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
None			

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X) Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
None								

STIMULATION BY ACID OR FRACTURING

DATE	Interval Treated	Materials and amount used
11-07-82	1791' - 2200'	1000 gals 28% HCl

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
None				

MECHANICAL LOGS, LIST EACH TYPE RUN — **DEPTH CORRECTION** — **DEVIATION SURVEY** — **PLUGGED BACK**

	Brand	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECT'N	RUN AT	DEGREES	YES	NO	DEPTH
	Schlumberger		None				2200'	3/4°			
	Birdwell										
OTHER											

PRODUCTION TEST DATA

OIL – Bbls/day	GRAVITY – °API	COND. Bbls/day	GAS – MCF/day	WATER – Bbls/day	H_2S – Grains/100 cu. ft.	B.H.P. AND DEPTH
			61 BPH on vacuum			

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
11-09-82	Ronald R. Suckle, Vice President-Operations	Ronald R. Suckle

NOTICE REPORT COMPLETE SAMPLE AND FORMATION RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE

R - 7210
Rev. 3/77

FORMATION RECORD

Permit No. 36221

ELEVATION USED:	GEOLOGIST NAME:	TOPS TAKEN FROM:
1120.6'K.B.	Warren A. Baumann/Jim Sanborn	☐ DRILLERS LOG ☒ SAMPLE LOG ☐ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
		DRIFT
0	781	Sand & gravel. Sm redish shales.
		COLDWATER 781 (+ 340)
781	1506	Sh, lt-med grys, frm, sub rnd, sli calc, pyr.
		ANTRIM 1506 (- 385)
1506	1750	Shale, blk to dk brn, frm-britt, sub rnd v. grainy text, fnt yel glo flor.
		TRAV FORM 1750 (- 629)
1750	1816	Sh, lt grys frm, sub rnd. Sm dolic, brn stringers, v. calc. pyr.
		TRAV LIME 1816 (- 695)
1816	1870	Ls, lt tan to buff, fxln, mhd, gd, intrxln & micro pore Ø, nc vis, stn, cln.
1870	2100	Ls, lt-med brns, vfxln, hd dns arg, sm gy shale, stringers. Trs, suc Ø cln, abnt fos.
2100	2200	Ls, med gy brn to crmy tans, vfxln, hd dns, arg, sm gd micro, por Ø intrvl from 2100 - 50. No stn - fos.
		DTD - 2200'

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

ATTACHMENT M

CONSTRUCTION DETAILS

Weber #4-8 -WELL CONSTRUCTION SUMMARY

The Weber #4-8 was drilled by Reef Petroleum Corporation in 1982.

a. Location: Sec. 8, T25N, R11W, Mayfield Township, Grand Traverse County, MI

b. Drilling Began: Nov. 03, 1982

c. Well Completed: Nov. 8, 1982

d. Total Depth: 2200' K.B. (15' above ground level)

e. Formation at T.D.: Traverse Limestone

f. Type completion - open hole

g. Surface Casing
8 5/8", 24.0 pound per foot casing set in 12 1/4" hole at 911' K.B. and cemented with 250 sacks of 50-50 pozmix containing 6% gel and 3% CaC12 and 200 sacks of Class A cement containing 3% CaC12. Circulated 40 barrels of cement to surface.

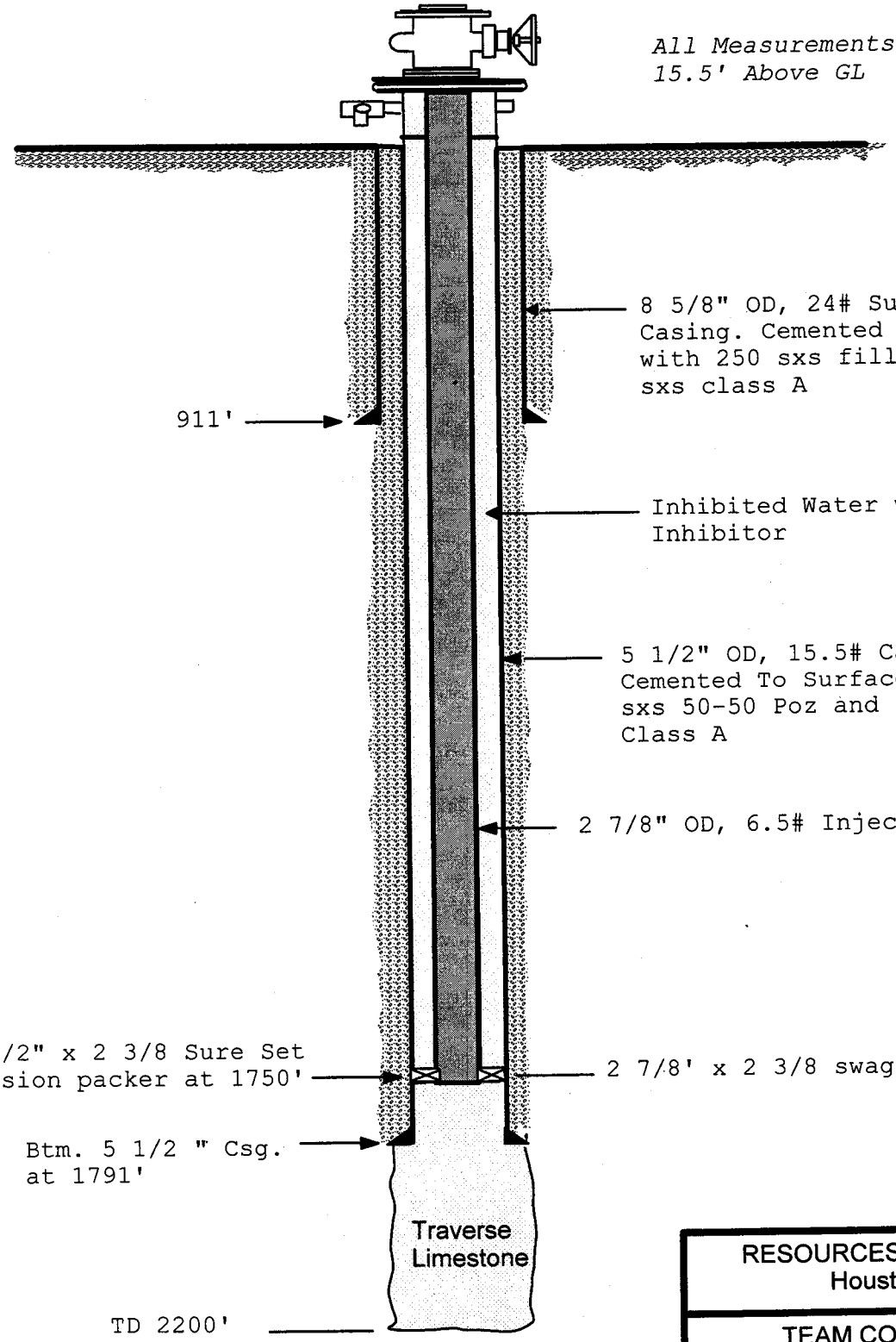
h. Protection Casing
5 1/2", 15.5 pound per foot casing set in 7 7/8" hole at 1791' K.B. Cemented with 130 sacks of 50-50 pozmix containing 6% gel and 3% CaC12 and 175 sacks of Class A cement containing 3% CaC12.displaced with 43 ~bls/ water. Circulated 2 barrels of cement to surface.

i. Tubing
2 7/8" O.D., 6.5 pound per foot, carbon steel tubing

j. Packer
Shure Set tension packer set at 1750' K.B.

k. Annular Fluid
Water with corrosion inhibitor.

Figure M-1



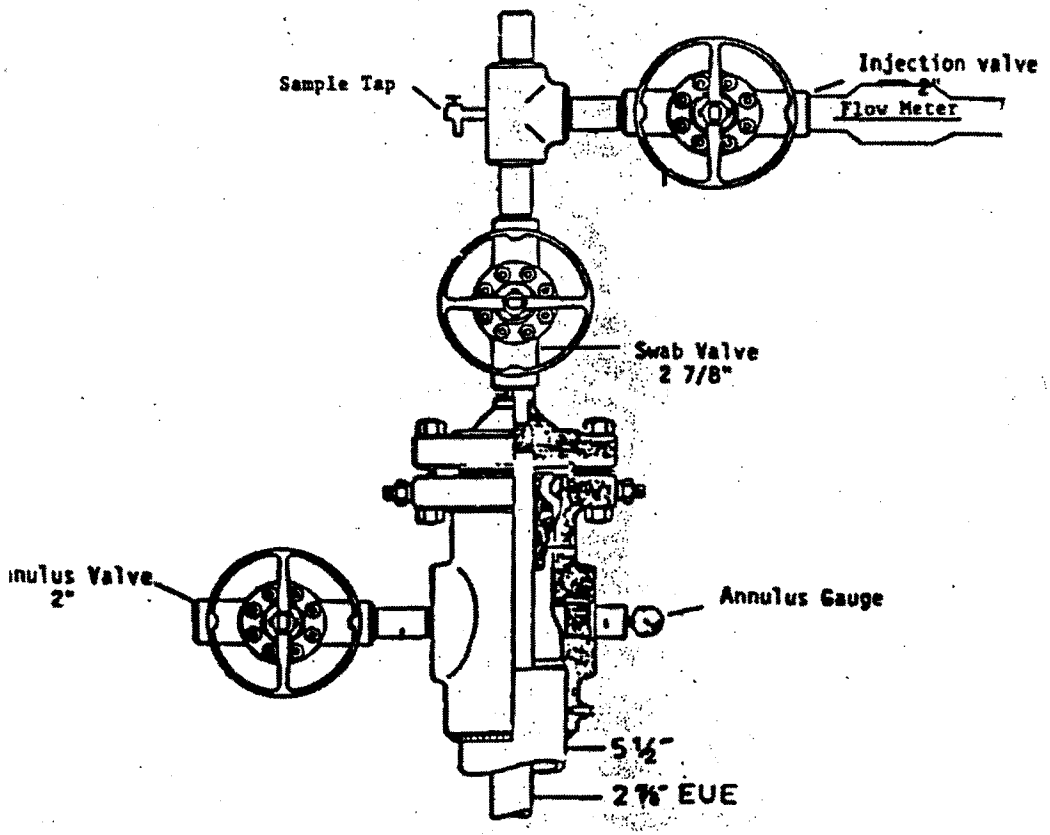
RESOURCES SERVICES USA Houston, Texas
TEAM COMPLETIONS KALKASKA, MICHIGAN
WEBER 4-8
Scale: None — Date 12/01/07

B & B Oilfield Equipment Corp.

WELLHEAD SPECIALISTS

W. H. (HAROLD) BANKS
PRESIDENT
BUSINESS PH (517) 773-6403

BOX 492
4741 EAST PICKARD
MT. PLEASANT, MI 48858
RES PH. (517) 826-6786



ATTACHMENT O

PLANS FOR WELL FAILURE

If Well #4-8 fails or is not usable, the well will be shut down until the condition is corrected. Any aqueous waste on site at the time of the failure will be held until the condition is corrected or will be hauled to a suitable offsite commercial treatment and disposal facility.

ATTACHMENT P
MONITORING PROGRAM

Continuously monitor pressure on the injection tubing.

Continuously monitor pressure between the tubing and the long string of casing.

Continuously monitor flow rate. The total volume of fluid injected can be determined from this information.

Daily monitor the annulus tank fluid level.

Record amount & type of liquid that is added or removed from annulus system.

File monthly, quarterly and annual reports required by US Environmental Protection Agency and the Michigan Department of Environmental Quality.

ATTACHMENT Q
PLUGGING AND ABANDOMENT PLAN
FOR WELL WEBER 4-8

(Prepared January 2008)

1. Notify regulatory agencies at least 45 days prior to commencement of plugging operations.
2. Pressure test casing tubing annulus to approximately 500 PSI. Run Temperature log from surface to bottom of casing (1791') to demonstrate external mechanical integrity.
3. Record pressure decay for 24 hours or for a time period specified by USEPA Director.
4. Flush well with approximately 100 barrels of clean brine.
5. Move in rig, pump and tank. Install blow out preventer.
6. Release packer and remove injection tubing and packer.
7. Run casing inspection survey on 5 1/2" casing from ±1791' to the surface.
8. Run and set cement retainer in 5 1/2" casing at ±1771'. Pump 150 sacks of cement through retainer. Release workstring from retainer.
9. After allowing sufficient time for the cement to set, pressure test casing to 500 PSI.
10. Run work string to top of cement retainer (or top of cement). Use Balance Method to place cement from approximately 1771' to ±900'.
11. After allowing cement to set, tag top of cement.
12. Run work string to top of the second cement plug (±900'). Use Balance Method to place cement from ±900' to surface.
13. Remove BOP and wellhead equipment. Release equipment
14. Install a permanent marker on the well site.
15. Prepare a plugging report and a final well status drawing.

ATTACHMENT R
NECESSARY RESOURCES

ATTACHMENT T
EXISTING PERMITS

EXISTING PERMITS:

Michigan Permit # 36221.

USEPA Permit #MI-055-2D-C034

ATTACHMENT U
DESCRIPTION OF BUSINESS

Team Completions has been involved in the transportation and disposal of oilfield salt water at this facility since approval was granted to operate the Weber 4-8 on July 23, 2004. Team Completions is now making application to dispose of leachate water from the Glen's Sanitary Landfill in addition to the salt water presently being injected into the Weber #4-8.

All fluids to be injected are considered to be nonhazardous per RCRA regulations.

TEAM
Completions, LLC

July 15, 2008

US – EPA
REGION 5
77 West Jackson Blvd
Chicago, IL 60604-3590

Re: **Michigan DEQ Application for Permit to Convert and Operate Well**
Weber # 4-8 SWD, Class II, Type "D"
Permit # MI-055-2D-C034

Dear US – EPA:

With reference to the above Application, a Conformance Bond in the amount of TWENTY-THOUSAND AND NO/100 ($20,000) is currently held at Northwestern Bank located at 112 S. Cedar Street, Kalkaska, MI. The Certificate of Deposit No. is 059001578.

Upon acceptance of this Application, Team Completions, LLC, will increase the bond amount to $30,000.

If you have any questions or need additional information, please do not hesitate to contact me at 231-384-0306.

Sincerely,

TEAM COMPLETIONS, LLC

Michael J. Goggin
Controller, CPA

MG:mrf

P.O. Box 1104
Kalkaska, MI. 49646
231-258-9130 Fax 231-258-8760

DEQ MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY

APPLICATION FOR PERMIT TO:
☐ DRILL ☐ DEEPEN ☒ CONVERT
AND OPERATE A WELL

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

1a. Part 615 Supervisor of Wells
☐ Oil and Gas
☒ Brine Disposal
☐ Hydrocarbon Storage
☐ Injection for Secondary Recovery

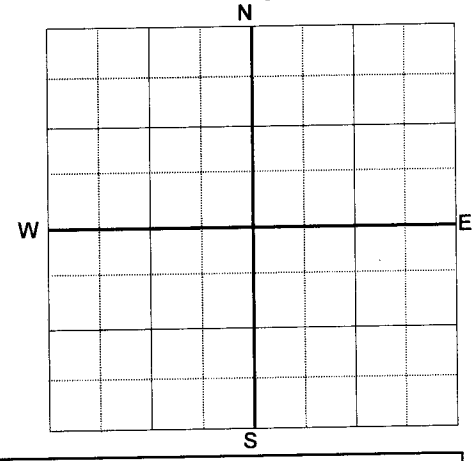
1b. Part 625 Mineral Wells
☒ Waste Disposal
☐ Brine Production
☐ Processed brine disposal
☐ Storage
☐ Test, fee sched. on rev.

1c. Fee enclosed
☒ Yes
☐ No, revision of application
☐ No, leg of horz drainhole

2. List all previous permit numbers
MI #36221, USEPA #MI-055-2D-C034

3. Fed. ID. No. (do not use SSN)
38-3578027

Locate well and outline drilling unit on section plat



4. Conformance bond
☐ Blanket ☒ Single well

5. ☐ Attached ☐ On file

6. Bond number

7. Bond amount

8. Applicant (name of permittee as bonded)
Team Completions L.L.C.

9. Address
P.O. Box 1104
Kalkaska
MI
49646

Phone
231.258.9130

I authorize DEQ 4 additional days to process this application.
☐ Yes ☐ No

10. Lease or well name (be as brief as possible)
Weber

Well number
4-8

11. Surface owner
Team Completions L.L.C.

12. Surface location
SW 1/4 of NE 1/4 of NE 1/4 of Sec 8 T 25N R 11W
Township: Mayfield
County: Grand Traverse

13. If directional, bottom hole location
1/4 of 1/4 of 1/4 of Sec T R
Township
County

14. The surface location for this well is
1115 feet from **nearest** (N/S) N section line AND 1209 feet from **nearest** (E/W) E section line

15. Is this a directional well? ☒ No ☐ Yes If yes, complete line15. The bottom hole location for this well is
_____ feet from **nearest** (N/S) _____ section line AND _____ feet from **nearest** (E/W) _____ section line

16. The bottom hole location (whether straight or directional) of this well is
_____ feet from **nearest** (N/S) _____ drilling unit line AND _____ feet from **nearest** (E/W) _____ drilling unit line

17. Kind of tools
☒ Rotary ☐ Cable ☐ Combination

18. Is sour oil or gas expected?
☒ No ☐ Yes ☐ H_2S Cont. plan enclosed

19. Base of lowest known fresh water aquifer
Formation Glacial Drift Depth 781'

20. Intended total depth
MD 2200 TVD

21. Formation at total depth
Traverse Lime

22. Producing/injection formation(s)
Traverse

23. Objective pool, field, or project
Injection well

24. PROPOSED DRILLING, CASING AND CEMENTING AND SEALING PROGRAM

HOLE			CASING			CEMENT			MUD	
Depth (MD)	Geol. Formation	Bit Dia.	O.D. Size	Wt/Ft Grade Condition	Depth (MD)	Sacks	T.O.C.	W.O.C	Wt.	Vis.
911'	Coldwater	12 1/4"	8 5/8"	24# used	911'	450	surf.		8.6	31
2200'	Traverse	7 7/8"	5 1/2"	15.5#, K-55, used	1791	305	surf.		8.8	30

25. DETAIL CEMENTING PROGRAM. IDENTIFY ALL CEMENT CLASSES, ADDITIVES, AND VOLUMES (IN CU. FT.) FOR EACH CASING STRING.

Surface 250 sxs 50-50 poz w/ 6% gel, 3% CaCl2 + 200 sxs. Class A w/ 3% CaCl2 - Circ'd 40 bbls cmt. to surface

Intermediate

Production/Injection 130 sxs 50-50 poz w/ 6% gel, 3% CaCl2 + 175 sxs. Class A w/ 3% CaCl2 - Circ'd 2 bbls cmt. to surface

26. Send correspondence and permit to
Name Team Completions E-mail timt@teamCompaniesllc.com
Address PO Box 1104 KALKASKA MI 49646 Phone 231-357 1016

CERTIFICATION "I state that I am authorized by said applicant. This application was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Enclose permit fee of $300 for all Part 615 wells; $2,500 for a Part 625 waste disposal well; or $500 for a brine production, processed brine disposal, or storage well. Make checks payable to State of Michigan.

DEQ Cashier use only.

27. Application prepared by (print or type) Phone
DON TINKER 231-357-1016

28. Signature Date
Don Tinker 6-24-08

Office of Geological Survey Use Only

Permit number	API number	Date issued	Owner number

EQP 7200-1 (rev. 5/2007) SEE INSTRUCTIONS FOR MAILING ON REVERSE

Team Completions
Kalkaska, Michigan

Application for Converting Weber 4-8 From a Class II Type D Disposal Well to a Class I and Class II Type D Disposal Well

Well Identification

Name of Applicant	:	Team Completions L.L.C.
Address	:	PO Box 1088 Kalkaska, Michigan 49646
Well Name and Number:		Weber 4-8 SW, NE, NE Sec 8, T25N, R11W Mayfield Township Grand Traverse County, Michigan

The following information is included in this section:

- Project Description
- MDEQ Form 7200-1 (Application For Permit)
- MDEQ Form 7200-3 (Environmental Impact Assessment)
- MDEQ Form 7200-14 (Injection Well Data)
- Surveyed Plat of Well Location

PROJECT DESCRIPTION

General Description

This Application for Permit is for the purpose of adding leachate water from the Glen's Sanitary Landfill to the saltwater presently being injected into the Weber #4-8 Saltwater Disposal Well.

The Weber #4-8 was originally drilled in November of 1982 under Michigan Permit #36221. The well is presently operated as a commercial saltwater disposal well under USEPA Class II, Type "D" Permit #MI-055-2D-C034.

The location of the well and surface facility is shown on the surveyed plat at the end of this attachment.

Type Injectate

Sodium Chloride/Calcium Chloride brine water produced from the Niagaran is presently being injected into the Traverse and Traverse Lime formation between 1791 and 2200 feet. The brine has a specific gravity of from 1.02 to 1.07 (8.5 to 8.9 pounds/gallon).

It is proposed that in addition to the present brine water being injected that leachate from the Glen's Sanitary Landfill at Maple City, Michigan be injected. Typical analysis of the leachate is shown on page in Attachment "H"

The anticipated daily injection rates are between 29 and 146 gallons per minute (1000 bbl to 5000 bbl per day). It is expected that the combined waste fluids will be injected at zero surface pressure and no pumps will be required.

The injectate is classified as non-hazardous as defined by Rule 299.9203 of Act No. 64 Hazardous Waste Management Act, 1979 PA 64 as amended.

Surface & Mineral Ownership

The proposed well is located on private property owned by Team Completions L.L.C.

Public Lands Involved

No State or Federal minerals and/or land interests are part of this project.

NOTICE OF INTENT

Notice of intent to complete Weber 4-8 as a Class I disposal well will be advertised in local newspaper.

SURFACE DESCRIPTION

Surrounding Area

The surrounding area is primarily used for agriculture with some oil and gas industry activities. Residences are scattered along area roads. Miller Road is approximately 1100' to the North, Highway 37 is approximately 1200' to the East, Harrand Road is approximately 4200'to the South and Botts Road is approximately 1400' to the West of the Weber 4-8 well.

There are no major waterways, lakes or streams with 1320' of Weber 4-8.

Current Land Use

The current use of the area is for the disposal of saltwater into the Weber 4-8. Present surface facilities consist of an unloading ramp, storage tanks, security fence and containment dikes.

ENVIRONMENTAL IMPACT ASSESSMENT FOR MINERAL WELLS AND SURFACE FACILITIES

To be submitted with an application for a well permit pursuant to Part 625, 1994 PA 451, as amended (The Act) or prior to construction of associated surface facilities located more than 300 feet from the proposed well.

Check all boxes and fill in all blanks that apply to the proposed well(s) or proposed surface facility.

Submit a *Soil Erosion and Sedimentation Control Plan* (EQP 7200-18) for each drill site, surface facility and flowline identified in the EIA.

This EIA is for (check one)

- ☐ Well only. Complete Parts A, B, D, E, and F
- ☐ Surface facility only (to be constructed more than 300 feet from the well). Complete Parts A1, A2, C, D, E, and F
- ☒ Well and surface facility. Complete all Parts.

A. PROJECT DESCRIPTION

1. Applicant

Team Completions L.L.C.

2. Well name and number

Weber 4-8

3. Well type

- ☐ Artificial brine production well
- ☐ Natural brine production well
- ☐ Test well greater than 250' deep or penetrating below deepest freshwater aquifer
- ☐ Blanket test well(s) Number of proposed wells __ Anticipated maximum depth _____
- ☐ Processed brine disposal well
- ☐ Single-source, non-commercial, waste disposal well
- ☒ Multi-source commercial non-hazardous waste disposal well
- ☐ Multi-source commercial hazardous waste disposal well
- ☐ Storage well

4. ☐ Yes ☒ No Is this well a replacement for an existing well?

If Yes, list

- Existing well name and number
- Current owner
- Existing well type and status
- Existing well location
- Reason for replacement
- Disposition of existing well

5. ☐ Yes ☒ No Is this well a reentry of an existing well?

If Yes, list

- Existing well name and number
- Current owner
- Existing well type and status

Reason for reentry

6. ☐ Yes ☒ No Is the well expected to encounter hydrogen sulfide (H_2S)?

If Yes, list formations expected to contain H_2S and anticipated depths to tops of formations

Well drilled and completed in 2002.

7. ☐ Yes ☒ No Is the well expected to encounter oil or gas?

If Yes, list formations expected to contain oil or gas and anticipated depths to tops of formations

8. ☐ Yes ☒ No **Will the well be drilled from an existing drill pad?**
If Yes, list well name, number, permit number and status of all existing wells on the drill pad (if no wells, write "none")

No well to be drilled. Permit application is to inject Class I fluid in existing Class II well.

Show proposed well and all existing wells on accompanying scale map identified as applying to Part A1 of the EIA.

B. DRILLSITE

1. **Drill site access route dimensions** _____feet x _____feet.
Provide a detailed description of topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use for the drill site access route. Show route on accompanying scale map labeled **Part B1**.

2. **Drill site dimensions** _____feet x _____feet.
Provide a detailed description of topography, drainage, soil types(s), direction and percentage of slopes, land cover and present land use for the drill site. Show well site on accompanying scale map labeled **Part B2**

NOTE: If any "Yes" box in items B3, B4, B5, B6, B7 or B8 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to Part B of the EIA.

3. ☐ Yes ☐ No **Are drain tiles present on the drill site?**
If Yes, how they will be handled if they are encountered?

No drill site required. Permit application is to inject Class I fluid in existing Class II well.

4. **Are any of the following located within 600 feet of the proposed wellhead?**
☐ Yes ☒ No Buildings
☐ Yes ☒ No Domestic fresh water wells
☐ Yes ☒ No Public roads
☐ Yes ☒ No Railroads
☐ Yes ☒ No Power lines
☐ Yes ☒ No Pipelines
☒ Yes ☐ No Other man-made features (list individual features)

Only existing Team Completions' roads, electric power and facilities within 600' of well.

5. **Are any of the following located within 800 feet of the proposed wellhead?**
☐ Yes ☒ No Type IIB public water wells Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year.
☐ Yes ☒ No Type III public water wells Type III is a public water supply which is neither Type I nor type II.

6. **Are any of the following located within 1320 feet of the proposed wellhead?**
☐ Yes ☒ No Surface waters and other environmentally sensitive areas
☐ Yes ☒ No Floodplains associated with surface waters
☐ Yes ☒ No Wetlands, as identified by sections 30301 to 30323 of the Act.
☐ Yes ☒ No Natural rivers, as identified by sections 30501 to 30515 of the Act
☐ Yes ☒ No Threatened or endangered species as identified by sections 36501 to 36507 of the Act

7. Are any of the following located within 2000 feet of the proposed wellhead?

☐ Yes ☒ No Type I public water wells
Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.

☐ Yes ☒ No Type IIA public water wells Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year.

8. ☐ Yes ☒ No Are Great Lakes shorelines located within 1500 feet of the proposed wellhead?

9. ☐ Yes ☐ No Will fresh water be used to drill this well?

If Yes, will the water be supplied from

☐ A "permanent" water well, to be retained after final completion OR used for drinking water (to be drilled and installed pursuant to Part 127 of 1979 PA 368, as amended) **OR**

☐ A "temporary" water well, to be plugged upon final completion and not used for drinking water **OR**

☐ Another source (identify)

If No, identify the drilling fluid to be used.

10. Drilling fluid pit location and handling and disposal of drill cuttings, muds and fluids

Anticipated depth to groundwater _____ Depth determined by _____

Pit type

☐ On site in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Show proposed pit location on accompanying scale map labeled **Part B10**.

☐ Remote in-ground pit. Anticipated dimensions: L ___ W ___ D ___
Attach approval of landowner and show remote pit location on accompanying scale map labeled **Part B10**.

☐ On-site steel tanks with no in-ground pits (complete 10a and 10d below, do not complete 10b and 10c)

a. ☐ Yes ☐ No Will the well be drilled into or through bedded salt deposits?

If Yes,

☐ Yes ☐ No Will the drill cuttings contain solid salt?

If Yes, describe plans for handling and disposing of drill cuttings.

b. ☐ Yes ☐ No Will the drilling fluid pit contents be solidified after drilling?

If Yes, identify the pit solidification contractor and pit solidification method.

c. ☐ Yes ☐ No Will the drilling fluid pit contents be removed after drilling?

If Yes, identify the site for disposal of the removed material.

d. ☐ Yes ☐ No Will any pit fluid be disposed by a licensed liquid waste hauler?

If Yes, identify the waste hauler.

If No, describe disposal plans for pit fluids.

Well drilled in 2002

C. SURFACE FACILITY

1. ☒ **Yes** ☐ **No** **Will the well have associated surface facilities?**
   If No, Do not complete the remainder of Part C.
   If Yes,
   ☒ **Yes** ☐ **No** **Does a surface facility currently exist?**
   If Yes, show facility location relative to the wellhead on a scale map labeled Part C1. Do not complete the remainder of Part C.
   If No,
   ☐ **Yes** ☐ **No** **Has a location for the surface facility been chosen?**
   If Yes, complete Parts C2 through C10
   If No, at least 60 days prior to beginning construction, submit an EIA for the Surface Facility (this form), a facility plan, and a Soil Erosion and Sedimentation Control Plan (EQP 7200-18) to the Office of Geological Survey District Supervisor.

2. ☐ **Yes** ☒ **No** **Is the proposed surface facility site more than 300 feet from the wellhead?**
   If Yes, complete Parts C3 through c10 and submit a map showing the location of the surface facility site relative to the wellhead.
   If No, do not complete the remainder of Part C.

3. **Dimensions of surface facility access road:** ___feet x ___feet.
   Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

4. **Dimensions of surface facility site:** ___feet x ___feet.
   Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use:

NOTE: If any "Yes" box in items C5, C6, C7, C8, C9, or C10 is checked, the corresponding feature(s) must be identified on an accompanying scale map identified as applying to the appropriate section of Part C of the EIA.

5. ☐ **Yes** ☐ **No** **Are drain tiles present on the proposed surface facility site?**
   If Yes, discuss how they will be handled if they are encountered?

6. **Are any of the following located within 600 feet of the proposed surface facility site?**
   ☐ Yes ☐ No Buildings
   ☐ Yes ☐ No Domestic fresh water wells
   ☐ Yes ☐ No Public roads
   ☐ Yes ☐ No Railroads
   ☐ Yes ☐ No Power lines
   ☐ Yes ☐ No Pipelines
   ☐ Yes ☐ No Other man-made features (list individual features)

7. **Are any of the following located within 800 feet of the proposed surface facility site?**
   ☐ Yes ☐ No Type IIB public water wells. Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year.
   ☐ Yes ☐ No Type III public water wells. Type III is a public water supply which is neither Type I nor type II.

8. Are any of the following located within 1320 feet of the proposed surface facility site?

- ☐ Yes ☐ No Surface waters and other environmentally sensitive areas
- ☐ Yes ☐ No Floodplains associated with surface waters
- ☐ Yes ☐ No Wetlands, as identified by sections 30301 to 30323 of the Act.
- ☐ Yes ☐ No Natural rivers, as identified by sections 30501 to 30515 of the Act
- ☐ Yes ☐ No Threatened or endangered species as identified by sections 36501 to 36507 of the Act

9. Are any of the following located within 2000 feet of the proposed surface facility site?

- ☐ **Yes** ☐ **No** Type I public water wells. Type I is a community water supply with year-round service, ≥ 15 living units or ≥ 25 residents.
- ☐ **Yes** ☐ **No** Type IIA public water wells Type II is a non-community water supply with ≥ 15 service connections or ≥ 25 individuals for not less than 60 days per year.

10. ☐ **Yes** ☐ **No** **Are Great Lakes shorelines located within 1500 feet of the proposed surface facility site?**

D. FLOWLINE

☐ **Yes** ☒ **No** **Will the well have an associated flow line?**

If Yes,

Flow line rout dimensions _____ feet x _____

Show flow line route from well to the surface facility, junction with an existing flowline or gathering system, on a scale map labeled **Part C2.**

Anticipated maximum operating pressure (psig): _____

Describe leak detection program, including schedules of periodic pressure testing and periodic flowline patrols.

Flow line material: _____

Describe the topography, drainage, soil type(s), direction and percentage of slopes, land cover and present land use along the flow line route.

☐ **Yes** ☐ **No** **Will the flowline be buried?**

If Yes

Burial depth: _____ feet

Describe flowline route marking scheme.

If No, describe measures to protect flowline from vehicular damage.

E. MITIGATION OF IMPACTS FROM DRILLING AND/OR OPERATION

Describe measures to be taken to protect environmental and/or land use values at the well/surface facility sites(s)

No drilling required

F. CERTIFICATION

"I state that I am authorized by said applicant to prepare this document. It was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Name and title (printed or typed)	Authorized Signature	Date
Don Tinker Member	Don Tinker	6-25-08

Enclose with *Application For Permit To Drill*

Don TINKER

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY

INJECTION WELL DATA

Supplemental information for drilling or converting to an injection well

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

Applicant
Team Completions L.L.C
P.O. Box 1104
Kalkaska, MI 49646

Well name and number
Weber 4-8

INSTRUCTIONS: Complete all portions of form which apply to this well. **Attach supplemental documents as needed.**

1. File a separate plat which identifies the depth and location of this proposed well and all producing, abandoned, or drilling wells within 1320 feet of it. Also identify the permittee of each producing well within 1320 feet of this proposed well.
2. Enclose a copy of the completion reports for all wells and the plugging records for all plugged wells shown on the plat. Identify what steps will be necessary to prevent injected fluids from migrating up or into inadequately plugged or completed wells.
3. If this is an existing well to be converted to an injection well, enclose this form with an Application To Change Well Status (form EQP 7200-6). Also enclose a copy of the completion report and geologic description and electric logs for this well.
4. Injection wells (except for gas storage) must receive a mechanical integrity test every 5 years pursuant to Rule 324.805.

5. Type of fluids to be injected
☒ Brine ☐ Natural Gas (omit #7 & #12)
☐ Fresh Water (omit #12) ☒ Other Landfill Leachate

6. Maximum expected injection rate 5000 BPD

7. Specific gravity of injected fluid 1.00 to 1.07

8. Maximum expected injection pressure 0

9. Maximum bottom hole injection pressure 1019 PSI
Show calculations 2200' x .433 x 1.07 + 0 (surface press) = 1019 PSI (gradient = 0.463 PSI/FT

10. Fracture pressure of confining formation 1343 PSI
Show calculations Est. at 0.75 PSI/FT
1791 x 0.75 = 1343 PSI

11. Fracture pressure of injection formation 1650 @ TD
Show calculations Est. at 0.75 PSI/FT
2200' x 0.75 = 1650 PSI

12. Chemical analysis of representative samples of injected fluid
Specific conductance 7470 - 9970

Cation (mg/l)		Anions (mg/l)	
Calcium	47 - 78200	Chloride	1110 - 225000
Sodium	939 - 47000	Sulfate	< 10 - 83
Magnesium	52 - 8300	Bicarbonate	62 - 3540
Potassium	300 - 16800		

What was the source of this representative sample? Glen's Sanitary Landfill and Townsite 1-17 HD

13. Is this well to be completed in a potential or previous oil or gas producing formation? ☐ Yes ☒ No
If yes, provide a list of all offset permittees and proof of service of notification of this application to all permittees by certified mail.

14. Attach proposed plugging and abandonment plan. OR Briefly list depths, volumes and types of cement and mechanical plugs and depths where casing will be recovered.
Plugging and abandonment plan attached Section Q of report

Schematic of wellbore construction

Complete bottom of diagram as needed to conform with proposed construction (e.g. show rat hole below casing, open hole completion, packer loc. etc.)

Fresh water fms., name & depth
Glacial Drift 781'

Base of freshwater, name & depth
Glacial Drift 781'

Surface casing 8 5/8" "x 911 '
Amount of cement 450 sacks
T.O.C. 40 bbls. circ. to surface

Intermediate casing (if applicable)
"x '
Amount of cement sacks
T.O.C.

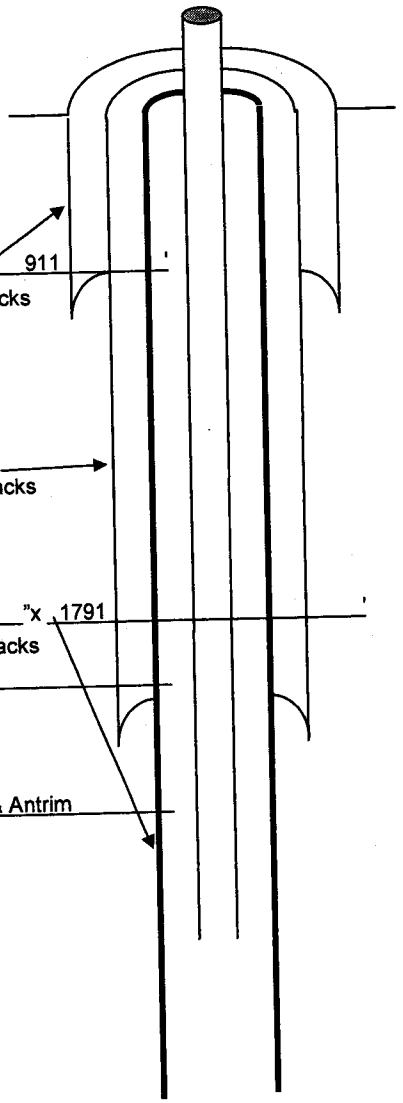
Long string casing 5 1/2" "x 1791 '
Amount of cement 305 sacks
T.O.C. 2 bbls. circ. to surface

Confining formation(s) Coldwater Shale & Antrim
Depth to top 781'
Depth to base 1816

Injection formation(s) Traverse
Depth to top 1816'
Depth to base +/- 2344'

Tubing 2 7/8", 6.5# " x 1750 '
Packer Depth 1750'

Bottom TD or PBTD 2200 ft.



Don Tinker

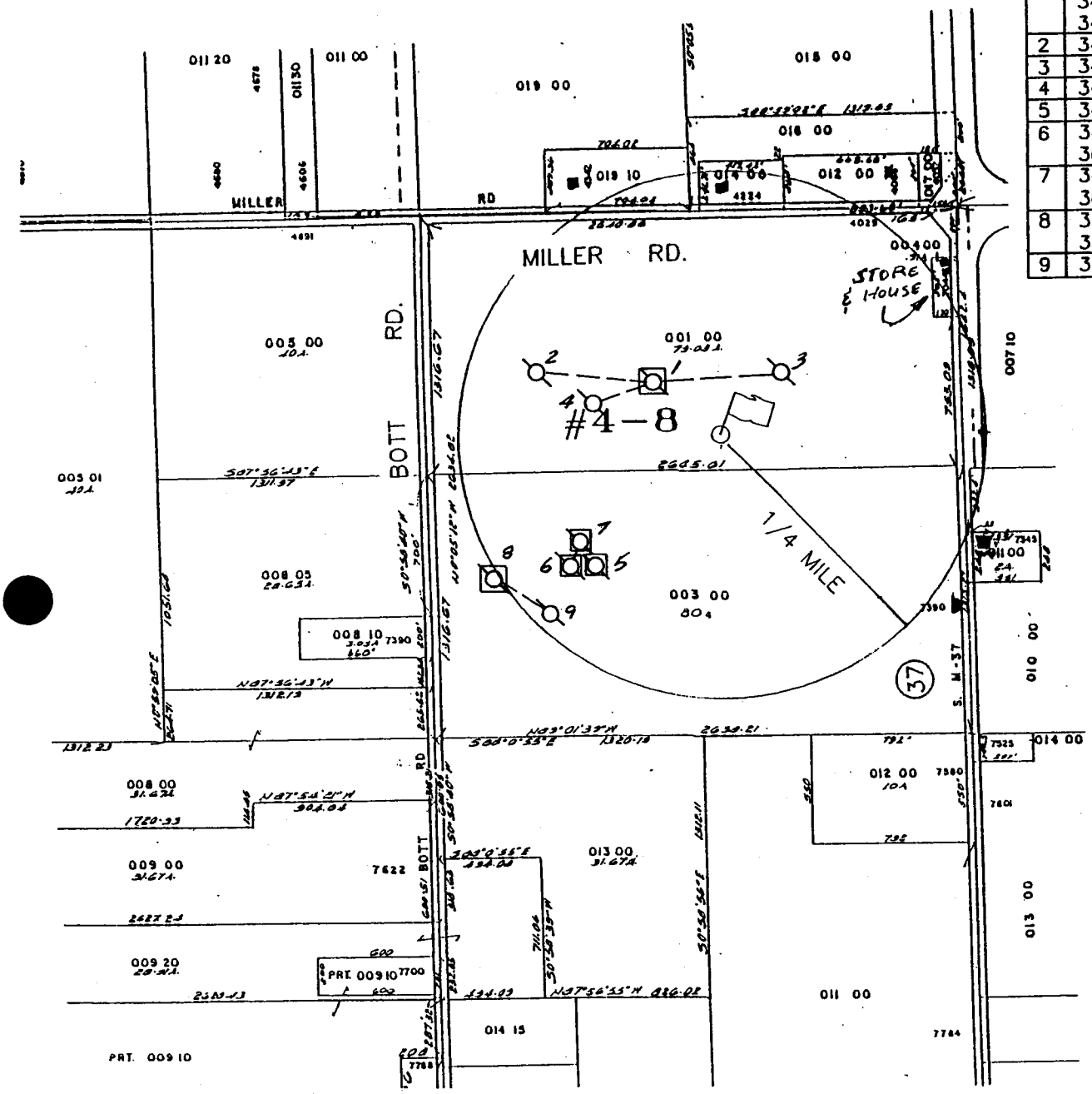
15. Application prepared by (print or type):

6-25-08
Date

1/4 MILE AREA OF REVIEW
WEBBER #4-8

WELLS WITHIN 1/4 MILE OF A.O.R. (ALL P AND A)

NO.	P/N	WELL NO.
1	34968	3-8C
	34506	3-8B
	34469	3-8A
	34419	3-8
2	34469	3-8A
3	34506	3-8B
4	34968	3-8C
5	34594	2-8
6	34147	1-8
	36359	2-8A
7	34594	2-8A
	36359	2-8A
8	33644	1-8A
	33597	1-8
9	33644	1-8A



■ = RESIDENCE

□ = SURFACE HOLE LOCATION

⌀ = BOTTOM HOLE LOCATION

0' 400' 800'

SCALE: 1" = 800'

G:\PROJECT\CAP\30402

FARRIER SURVEYING

P.O. BOX 998
244 S.CEDAR STREET
KALKASKA, MI 49646
TEL (231) 258-8162
FAX (231) 258-3249

P.O. BOX 1105
502 CAYUGA STREET
BELLAIRE, MI 49615
TEL (231) 533-8161
FAX (231) 533-5206

CLIENT TEAM COMPLETIONS

DESCRIPTION WEBBER #4-8
SW/4-NE/4-NE/4 OF SEC. 8
T25N-R11W, MAYFIELD TOWNSHIP,
GRAND TRAVERSE COUNTY, MICHIGAN

DRAWN: JM	FILE No. 30402
CHECK: DF	Fd. Bk. Pg.
REVISED: 11-26-02	DATE: 11-8-02
	SHEET: 1 of 1